ICoLIS 2021

Reimagining Libraries for a Post -Pandemic World

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UNIVERSITI MALAYA

Proceedings of the 8th International Conference on Libraries, Information & Society 2021 (ICoLIS 2021)

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18 - 19 August 2021 | Kuala Lumpur, Malaysia

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MESSAGE FROM THE VICE CHANCELLOR

Bismillahirrahmanirrahim.

Assalamualaikum WBT,

Invited International Keynote Speakers Colleagues, CEO & Chief Librarians, Academicians, Information Professionals and Companies which are related to these entities, The Library and Information Science Students and Researchers from Asia Pacific Members of Staff and Students.

It is my pleasure to welcome you all to the 8th International Conference on Libraries, Information and Society which starts today. This Conference serves the best interests not only for the academic but also to the expansive Library and information science sector in Malaysia and around the world. It is my hope that at the end of this conference, all of us are going to gain extensively in terms of knowledge and sharing of ideas that can positively transform our society and spark innovations. This conference comes at the most opportune time as our Nation is on its heels for new breath as the pandemic hit the world and at the backdrop of the government's commitment to the agenda of IR4.0 where the library and information science sector is best suited to deliver this top-notch agenda.

The department of Library and Information Science and the Library of Universiti Malaya continues to play a vital role in the success and sustainability of the library and information science movement in Malaysia and around world by training suitable manpower to manage the sector. I wish to reiterate our commitment to this course for the good of humanity.

The theme of this conference is "Reimagining Libraries for a Post-Pandemic World". In times when the pandemic is changing the world, the Conference Organizers embraces a precise emphasis on COVID-19 as significant to universal tests facing Library and information science in world.

Reimagining library services in the facade of a pandemic is more than a business for LIS practitioners - it is an obligation and an accolade to be that life-saving gauge and connection point to address the users' information needs in these extraordinary times. To keep our societies functional during this time of pandemic, library and information science sector have turned increasingly to digital services, resources, communication tools, networks and connections. This global health crisis can serve as an initiation point for library and information science sector of all sizes to explore solutions that intertwine their space, heightened technology, and local policies into a synergetic community resource offering access and service for all.

Arguments have been advanced that Library and Information Science movement globally have laid back in terms of innovations and especially in adoption of ICTs in their operations and sustained communications. As Library and Information Science sector adopting ICTs, they will be at a position to grow faster, reduce risks, and be more accountable and better in record management. I believe by the end of this 2-day Conference, practical solutions will be suggested to revitalize the Library and Information Science movement in Malaysia. Let us not be proud of just being the best in ASEAN; we need to be the best globally.

This conference will also create an immense resource and knowledge pool on Library and information science scholars. The best papers that will be picked in this conference are going to be published in our Malaysian Journal of Library & Information Science; this journal is an ignition spark into research on Library and information science in this country. Let this be the catalyst of the much-needed knowledge-based-economy in Library and information science movement.

Technology is a vital element that cannot be ignored in any sector. Its use in transformation of the data, information and knowledge sector enhances efficiency in the rich World of Library and information science in the world and in attracting more investors in its diversified fields. I challenge the researchers here today to think of a transformative and revolutionary use of technology that can help the Library and information science to attract more knowledge production from their members, diversify products, improve service delivery and attract the youth into the movement. This will create a culture of knowledge production amongst your groups and increase your fundamental bases; further, it will create new possibilities and frontiers for research in Malaysia.

Allow me at this moment to recognize and extend our warm appreciation to the 10 sponsors of this conference; whom are also our enthusiastic vendors of the Library and Information Sciences. On behalf of the Universiti Malaya, we are grateful and happy of your support. We look forward to future partnerships in similar and other endeavours.

I am certain that we are all going to put our best foot forward to make library and information science subject thrives in whichever small ways we choose to do it. We have never retreated from any type of battles – since the aftermath of the Second World War. As we could see there are resurgence of countries which have lifted billions of people out of extreme poverty, hunger, and injustice. But there are also many countries that succumbed to politics of powers. As true librarians being neutral to information and knowledge is our fundamental standard – how do we address war torn countries – how do we manage SDG 17 goals and now Covid19 ravaging our communities– are we going to surrender to fake news just to survive – do we pockets in integrities and hush the need to disseminate truth?

Yet, the remaining development challenges are creating critical barriers to reach the furthest behind. Widening socio-economic inequality, lagging social protection schemes, growing digital divide, rising climate change impacts, and rapidly eroding public trust need decisive actions now. Amid this regional development landscape, the outbreak of COVID-19 pandemic has further exacerbated fault line of our societies and polity.

Today, harnessing regional cooperation to advance the Sustainable Development Goals must remain our compass to build back better. No country can fight this pandemic alone, and no country can be secured when other countries in its neighbourhood are fighting the pandemic.

Investing in multilateralism cannot be over-emphasised for a better, greener, and resilient recovery in this Decade of Action. I am quite sure that this conference will provide us with many additional new ideas and insights.

Here in Malaysia – even though the recent re-emergence of Covid-19 within the community is worrying but we are confident through our collective efforts, we will overcome this pandemic with further passion to be contributing to the knowledge production in Malaysia. Perhaps, now than ever we are in the right place to develop new plans to make library and information science sector the leaders in the physical world. I am sure, you will all join with me thanking our academics colleagues, for being co- host today and during the whole conference.

As a concluding remark, I would like to take the opportunity to thank all our sponsors - they are indeed our friends in deeds - for the marvellous contribution of fund to the sponsorship drive which saw a 50% of fund beyond the targeted amount.

Thank you and God bless you.

YBhg. Professor Dato' Ir. Dr. Mohd Hamdi Abd Shukor
Vice Chancellor, Universiti Malaya.

MESSAGE FROM THE PROGRAMME CHAIR

In the Name of Allah, the Merciful, the Beneficent. Praise be to the Lord of all worlds. Prayers and peace be upon our Prophet, Muhammad, his family and all of his companions.

It is a great pleasure for me to extend our warmest welcome to about all participants and presenters to the 8th International Conference on Libraries, Information Society 2021 (ICoLIS 2021) virtually.

The University of Malaya Library and The Department of Library and Information Science, Faculty of Computer Science & Information Technology, University of Malaya has been organizing the International Conference on Libraries, Information Society since 2013.

Some the many objectives of ICoLIS 2021 are to provide opportunities for sharing and discussion of the current status, innovations, trends, research, directions, solutions, issues and challenges adopted in the fields of LIS. And hopefully with the new knowledge, we would be able to foster cooperation and collaboration among libraries and other organization. We should further understand the challenges, and perhaps we could together learn and optimize the contribution of scholarly research, innovative programs and strategies in the subject of library and information science for the benefits of our stakeholder. More broadly, we hope that these presentations and studies will help us to develop an understanding of richer theoretical framework for understanding the role of libraries.

The sudden outbreak of a deadly disease called Covid-19 shook the entire world. This situation challenged all system across the world and forced everyone to shift to an online mode of doing almost everything, overnight. Many academic institutions that were earlier reluctant to change their traditional pedagogical approach had no option but to shift entirely to an online teaching–learning. It is interesting how libraries are responding to the COVID-19 pandemic. The findings show that libraries continue to play necessary roles in our societies even as we close our buildings and work remotely to best ensure health and safety. Thus ICoLIS 2021 will discuss things which could give us some ideas to reimagine program and activities for the libraries. With a wealth of electronic books, streaming platforms and of course Zoom or Google meet, many were ready, with some adjustments, to provide services for their communities.

I hope we are here to appreciate and stand tall as library and information science practitioners – not even pandemic can stop us sharing to the world.

I sincerely hope that this conference will deliberate and discuss all the different facets of this exciting theme and come up with recommendations that will lead to a better, healthier, merrier mind and to the world.

HAPPY CONFERENCING!

Programme Chair
Khasiah Zakaria (Dr.)
Chief Librarian,
Universiti Malaya Library,
Universiti Malaya.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the name of Allah, The Most Gracious and The Most Merciful

It gives me a great pleasure to be given a chance to write down this message for the International Conference on Libraries, Information and Society (ICoLIS). This is the 8th time we are hosting the conference, this time in a different setting, a virtual conference adapting to the new norm due the pandemic COVID-19 that has knocked us all since 2020. This conference however has brought together members of the international library and information science community from the Asia Pacific region as well as from other parts of the world namely from Indonesia, Iran, Bangladesh, Pakistan and Malaysia. Additionally, it was a wonderful opportunity to have three speakers delivering their keynote speeches: i) YBhg. Dr. Rashidah Bolhassan, Permanent Secretary, Ministry of Welfare, Community Wellbeing, Women, Family and Childhood Development, Sarawak State, Malaysia; ii) Barbara Lison, President-Elect IFLA and Director of the Bremen Public Library, Germany; and iii) Prof. Dr. Cassidy Sugimoto, Chair, School of Public Policy, Georgia Institute of Technology, Atlanta, United State of America.

Reimagining Libraries for a Post-Pandemic World is the chosen conference's theme. The pandemic has brought challenges to library and information services, and LIS practitioners are using this period to rethink its platforms and processes, to be more innovative about how libraries interact with the users and stakeholders. Library and information services are being continuously re-designed during the COVID-19 phase and they may continue to be re-oriented in the next few years with new ways of working being experimented with. ICoLIS 2021 has provided a platform to share idea, practice and research in the context of libraries' response during the COVID-19 pandemic and determine their working practices, services patterns, strategies applied, and role played. We are pleased to have 14 interesting papers presented at this event.

I would like to express my appreciation to all who have given their time, energy and resources to make this conference a success. Without their help, commitment and devotion, this conference would not have materialized. I would also like to thank all sponsors for their generous contributions towards this conference. And for the participants I am once again most grateful for your attendance and participation and wish you would not make your presence to the ICoLIS 2021 as your last involvement. We look forward to seeing you again in ICOLIS 2023.

Stay safe everyone!

Programme Co-Chair
Associate Prof Dr Noorhidawati binti Abdullah
Head
Department of Library & Information Science,
Faculty of Arts and Social Sciences,
Universiti Malaya.

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KEYNOTE SPEAKER 1

YBhg. Dr. Rashidah Bolhassan

Permanent Secretary
Ministry of Welfare, Community Wellbeing,
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AGILITY. VELOCITY. RESILIENCY.

This paper presents an overview of the impacts of COVID-19 pandemic on the general community, and libraries. It is imperative for the library fraternity to be agile in reacting and preparing for the aftermaths of the pandemic, with speed and velocity of directions for strategies and actions, to ensure libraries sustain beyond being resilient.

Barbara Lison

President-Elect IFLA and Director of the Bremen Public Library, Germany

E-mail: Barbara.Lison@stadtbibliothek.bremen.de

THE STRENGTH OF LIBRARIES IN CRISES LIKE THE CORONA PANDEMIC

The Corona virus has flooded the whole world and is having an enormous impact on the work of libraries as well. How do they react to the challenges of restricted services or even total closure and shutdown? What might be the long-term consequences, the lessons learned and the take-aways? Which role do library associations play in supporting the libraries and librarians in these circumstances? With the focus on the situation in Germany as an example this talk will give an insight of how public libraries have been trying to overcome the initial shock and then to proactively start to cope with the critical situation and to discover chances for transformation.

Prof. Dr. Cassidy R. Sugimoto

Chair, School of Public Policy,
Georgia Institute of Technology, Atlanta,
United State of America

E-mail: sugimoto@gatech.edu

HOW THE PANDEMIC CAN PROPEL OPEN SCIENCE PRACTICES

The shock of the pandemic has been felt across all sectors of the society. Many adverse effects have been studied; however, the reactions to the pandemic may yield residual benefits in several sectors. Scholarly communication may be one such benefactor. The pandemic placed pressures on scientists, funders, and publishers to rethink their models of scholarship and prioritize openness. In this talk, we will discuss how the pandemic shifted the world towards open access and public dissemination of science. We will contrast this with other public crises, such as climate change. The recommendations will focus on the responsibilities of libraries and other scholarly actors in reimagining a more open science infrastructure in a post-pandemic world.

Current Status of Indian Open Access Institutional Repositories (OAIRs) and Its Significance in Pandemic Era

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ABSTRACT
The COVID-19 outbreak has affected the world among all segments of the population in all possible fields of life, viz health, economic, social & educational. In India, the second wave of the pandemic brings the nightmare on repeat with a tsunami of cases. To encounter this critical situation and to safeguard the health of the students & faculty members, the education system undergoes a significant change, from conventional classroom-based learning to online interaction-based teaching-learning. This turnabout demands the availability of sufficient e-content. In this situation, OAIRs as a free-to-use platform with a voluminous amount of data, are able to help users including the institutions in coping with financial critical situations as well as enabling the learning process. This study aims to determine the current status of Indian OAIR housed in OpenDOAR by conducting a user survey to assess its importance in assisting academics and the education system during this current pandemic situation. The findings of the study reveal that DSpace (58%) is the dominant software in Indian OAIRs while English (96.43%) is the most prominent language. Additionally, the study also identifies the continual growth of Indian OAIRs with regular updation. According to the survey result, library staff and researchers are the most experienced regarding the importance and benefits of OAIRs, whereas students need to be more aware. Overall, the survey agrees with the fact that, in India, OAIRs support the significant change in the education system as well as promote web accessibility and eliminate the digital divide.

Keywords: COVID-19, Digital divide, Education system, Indian Institutional repositories, Open access, OAIRs, OpenDOAR, Web accessibility

INTRODUCTION

"Socrates once said 'An unexamined life is not worth living'. Universities fail in this regard. Institutional repositories should be the means by which a university examines itself."
- Robert Koob, Provost and Vice-President of Academic Affairs, California Polytechnic State University (Tamminga 2009)

Open access journal & Institutional repositories are the two primary platform where a researcher can make his research papers publicly accessible. The origin of the open access institutional repositories (OAIRs) is primarily associated with the "crisis in scholarly communication", which is characterized by the rising cost of providing access to scholarly

publication and the increased restrictions on usage of scholarly material in the electronic environment (Panda 2020). Another major intention to build up an OAIR is to centralize & preserve the knowledge of the parent institution and facilitates anyone to access the knowledge hub just with internet access (Kathleen 2002). Most of the OAIRs offers a self-archiving facility and a minimum set of necessary services, e.g., deposit, download, search and access control.

On another side, the spread of the novel coronavirus COVID-19 has wreaked havoc on social contact & organisation worldwide, and the education sector is no exception (Murphy 2020). In India, with its deadly second wave, the education system faced a catastrophic collapse due to inevitable issues viz. loss of communication; shut down of school, college and universities; disruption of the formal learning process; unavailability of print materials and so on. It provokes the transformation of the learning process from conventional to digital. Such transition requires adequate availability of e-resources to support the education system. In such a financially critical situation, OAIRs provide an alternate way with a huge volume of openly accessible contents that assists students, researchers, faculty members & library professionals in completing their assignments, acting as a research assistant, supporting the teaching-learning process & satisfying user information need respectively.

The current research aims to identify the current status of OAIR in India housed in OpenDOAR and conduct a users' survey to evaluate its significance in support the academics & education system in this pandemic situation. The OpenDOAR is a quality-assured, global Directory of open access repositories that provide free & open access to academic outputs and resources developed in 2005 with collaboration with the University of Nottingham and Lund University and sponsored by OSI, Jisc, SPARC Europe & CURL (OpenDOAR n.d.).

OAIR & ITS FUNCTIONAL ENTITIES

Open Access (OA) repositories have attracted attention over the past several years, often as a significant way to promote open access to scholarly communication (Bhat 2010). As defined by the Scholarly Publishing & Academic Resources Coalition position paper, open access institutional repositories (OAIRs) were created to encourage scholarly communication outside traditional publishing models, demonstrate the prestige of institutions by highlighting their scholarly output, and to make this output accessible to the wider academic community (Crow 2002). Another definition is, "an online database … that makes the full text of items (or complete files) it contains freely and immediately available without any access restrictions" (Pinfield 2005).

This section aims to use the OAIS functional model to provide a more comprehensive overview of the functional entities of an IR. The formation of an IR can be classified into some common functional entities & six specific functional entities and related interfaces.

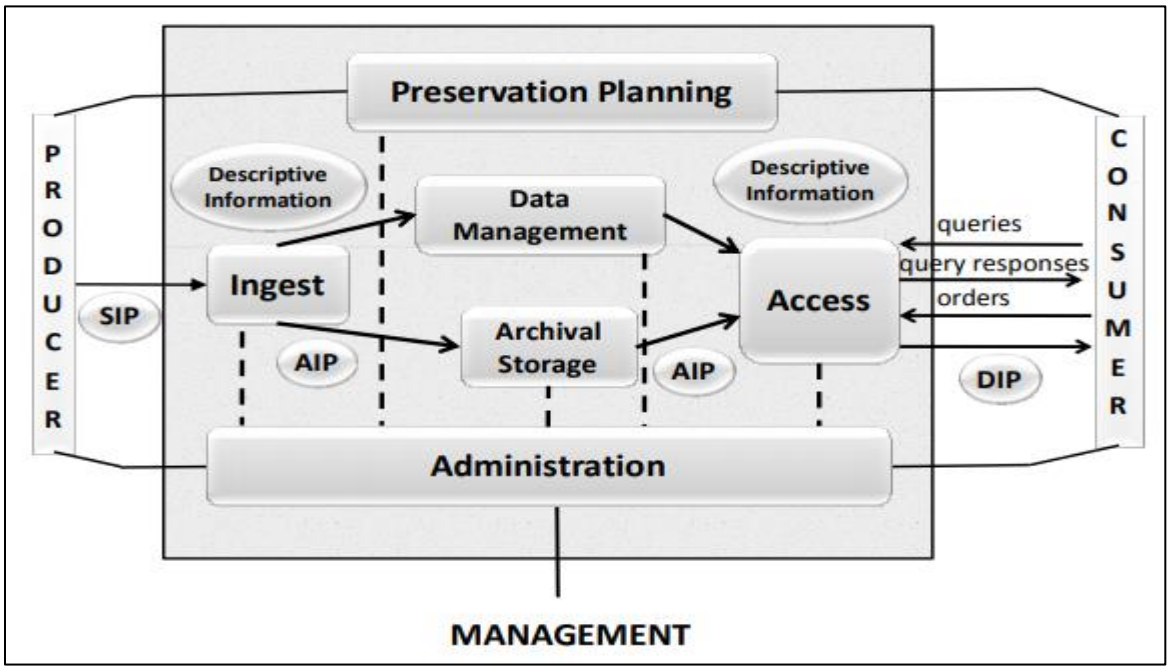

Figure 1: Functional Model of an IR (CCSDS 2012)

The role provided by each of the entities *(in figure 1)* is described briefly as follows:

(i) Common Services: Modern multifunctional & diversely distributed computing applications are interconnected with several supporting services. These common services are responsible for the completion of much excellent work. In the case of IR, Operating system services, Network services & Security services are includes in common services.

(ii) Ingest: Ingest covers the acceptance of submission information, performing quality checking on the data, generating an archival information package that complies with formatting and documentation standards and extracting and managing descriptive information for data updation and management.

(iii) Archival Storage: The Archival Storage Functional Entity provides the services and functions for the storage, maintenance and retrieval of Archival Information Packages (AIPs). After receiving AIPs from Ingest, Archival Storage adds them to permanent storage and provides the capability to reproduce the media over time, perform error checking, ensure disaster recovery and provide data as requested.

(iv) Data Management: Populating, maintaining & accessioning descriptive information & administrative data are enables by the Data Management functional entity. Database Management responsibilities include administering the Archive database functions, performing database updates, performing queries, generate query responses, and producing reports from these query responses.

(v) Administration: The Administration Functional Entity provides the services and functions for the overall operation of the Archive system. Administration functions

include soliciting & negotiating submission agreements, auditing submissions, maintaining archive standards & policies, maintaining configuration management of hardware & software, monitor & improve archive operations and inventory.

(vi) Preservation Planning: Preservation Planning includes monitoring user groups, emerging technologies, standards and platforms. The objective is to protect against obsolescence, develop preservation strategies and migration plans as required.

(vii) Access: The Access functional entity supports the users by providing detailed information about the existence, description, location and availability of information stored in the IR. Access is all about supporting users of the repository to identify, locate and retrieve the data they require.

LITERATURE REVIEW

At an early stage, Kalbande (2012) discussed the concept of institutional repository (IR), its need, importance, benefits, critical issues, major problems in the establishment & maintenance of IR, the role of librarians, intellectual society, academic institutions and the government. Lee et al. (2015) explored the efficiency of an IR to make scholarly publication openly accessible, using 170 journal articles as a study sample, and the Diginole Commons repository of Florida State University as a sample IR. With the help of OpenDOAR, Gul, Bashir, and Ganaie (2019) explored the status of IRs in the South Asian region and also studied the various characteristic features of IRs. The findings of the study suggested that India, Sri Lanka and Bangladesh lead other South Asian nations in terms of IRs count. Kalbande (2019) identified 84 Institutional Repositories of India from OpenDOAR and ROAR directory and presented Indian scenario by analyzing them using criteria like IR type, present status, software used, items available, subject classification & language. Adewole-Odeshi and Ezechukwu (2020) analyzed the OpenDoar directory to examine the growth of open access institutional repositories in Nigeria over the period 2009-2019. The study sample consists of 25 OAIR with 68,610 uploaded documents between these 10 years. Another study by Nayak et al. (2021) focused on the current status of SCO countries Open Access Institutional Repositories housed in Opendoar. The study findings revealed the identification of 214 repositories with the top registrations in 2011 and 2019, amidst 36 (16.82%) and 34 (15.89%), respectively. The paper of Gurikar and Hadagali (2021) determined the use of Open Source Software (OSS) in building Indian Institutional Repositories in different types of institutions, Indian States / UTs and different disciplines. A total of 209 Open Access Repositories were identified from Open DOAR, ROAR, AGRIS and LIS link Kerala. The outcomes of the study revealed that Dspace and Eprints are the most used OSS in Indian Institutional Repositories. The study of Shajitha and Majeed (2021) evaluated the institutional repositories (IRs) in South India in terms of policy and procedures, technology, content and contributors, promotion & assessment and personnel. Furthermore, the content growth of each of the 23 identified IRs were monitored for a year (from February 2018 to January 2019).

STUDY RATIONALE

All of the studies above investigated different aspects of open access institutional repositories (OAIR), from their significance & characteristics to their usefulness in making the Web more accessible. Considering the current Pandemic situation, OAIR plays an important role as a knowledge hub, freely available & accessible on the Web. However, no such research has been conducted directing particularly on this area. The focus of the current paper is to identify the significance of OAIR in this pandemic era after identifying the current status of Indian OAIR from the OpenDOAR directory.

STUDY OBJECTIVES

After thoroughly analyze the past researches & determined the study rationale, the objectives of the present study identifies as follows,

1) To study the current status of Indian OAIRs according to OpenDOAR database
   a) To find out the year-wise growth of Indian OAIRs
   b) To highlights the state wise distribution of Indian OAIRs
   c) To identify the various software used for creations of Indian OAIRs
   d) To know the different content types, subject area & languages of Indian OAIRs
   e) To check the updation regularity of Indian OAIRs
2) To examine the effectiveness of Indian OAIRs during pandemic era through users' survey

RESEARCH METHEDOLOGY

The research design of the current research is based on determining the current status of Indian OAIRs in OpenDOAR and the effectiveness of OAIRs to support the Indian education system in this pandemic situation. OpenDOAR currently covers a total of 98 Indian repositories, 84 of which are institutional repositories *(see figure 2)*. OpenDOAR was analyzed to get statistics of institutional repositories in India based upon parameters like year-wise growth, state-wise distribution, software types, subject areas, languages and last modified. The users' perspective determined by conducting a short survey. The survey questionnaire was designed upon a structured research questionnaire created through Google form (https://forms.gle/5f4E7GBRjiVTUK1g8) and circulated online via email to the targeted sample groups viz, Students, Researchers, Faculty Members & Library Professionals of all over India. It took almost two months and distributed over 600 targeted sample groups of which 538 (89.67%) took part in this survey from a different region of India. Among which, a total of 500 people was selected as a final study sample (i.e. 125 for each single sample type) and among them, 311(62%) Female, 158(32%) Male, & 31(6%) choose to prefer not to say about their gender *(see figure 3)*.

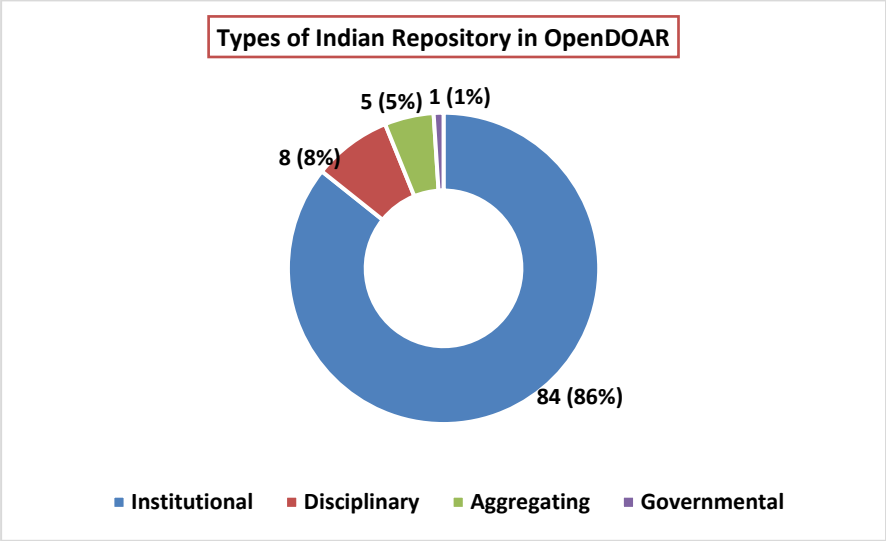

Figure 2: Types of Indian Repositories in OpenDOAR

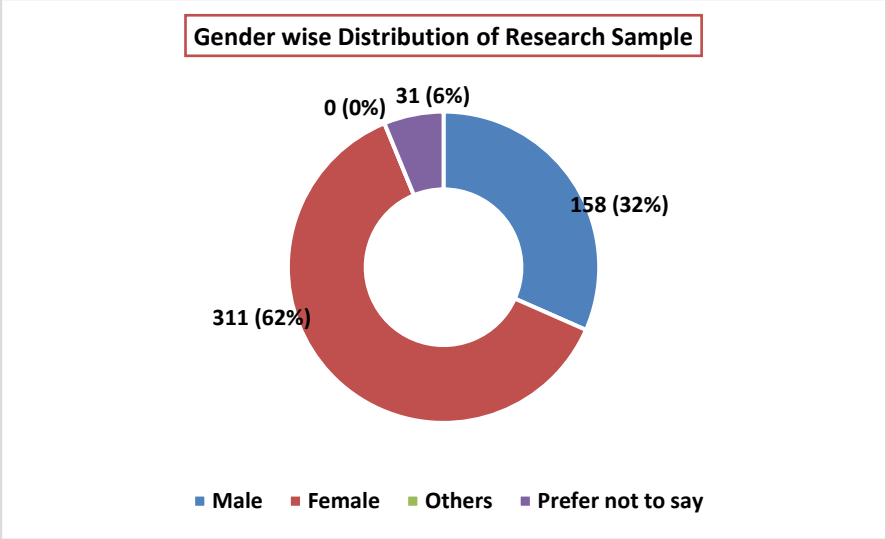

Figure 3: Gender Wise Distribution of Research Sample

INSTITUTIONAL REPOSITORIES IN INDIA: AN ANALYSIS OF THE CURRENT STATUS

To examine the current status of Indian OAIRs, statistics from OpenDOAR collected, categorized & explained according to some notable parameters viz. Year-wise growth, State-wise distribution, used software types, covered content types, language types, subject areas and updation regularity.

Growth of OAIRs Year Wise

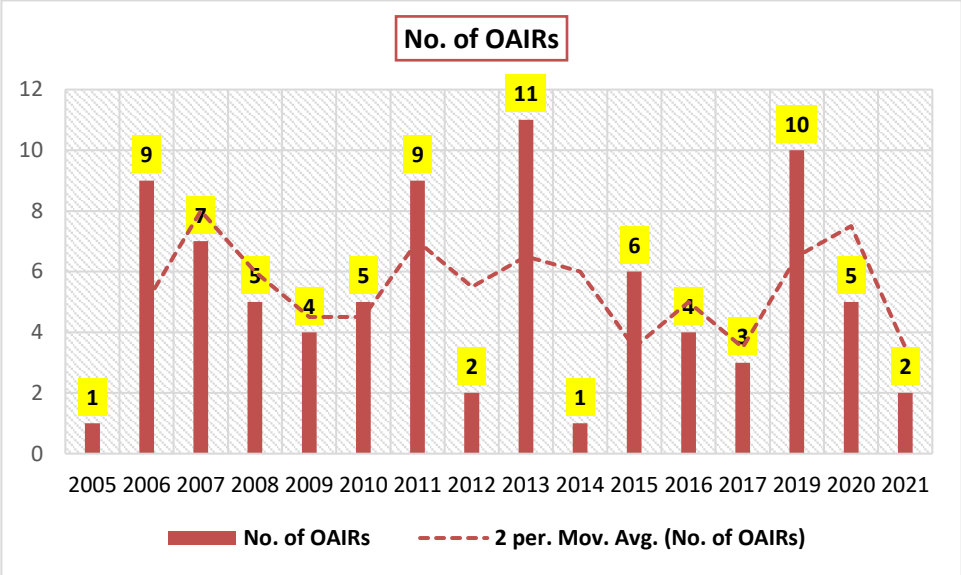

Figure 4: Year-wise Growth of Indian OAIRs

The figure 4 represents the growth of Indian OAIRs in OpenDOAR since its development. According to the statistics, a maximum number of Indian OAIRs developed in the year 2013 (i.e. 11) followed by 2019, 2011 & 2006 produced 10, 9 & 9 OAIRs, respectively. As of 2021, in OpenDOAR, till now two repositories are covered this year and a total of 84. Again, the figure of cumulative growth confirms the consistency of continual addition of OAIRs in OpenDOAR.

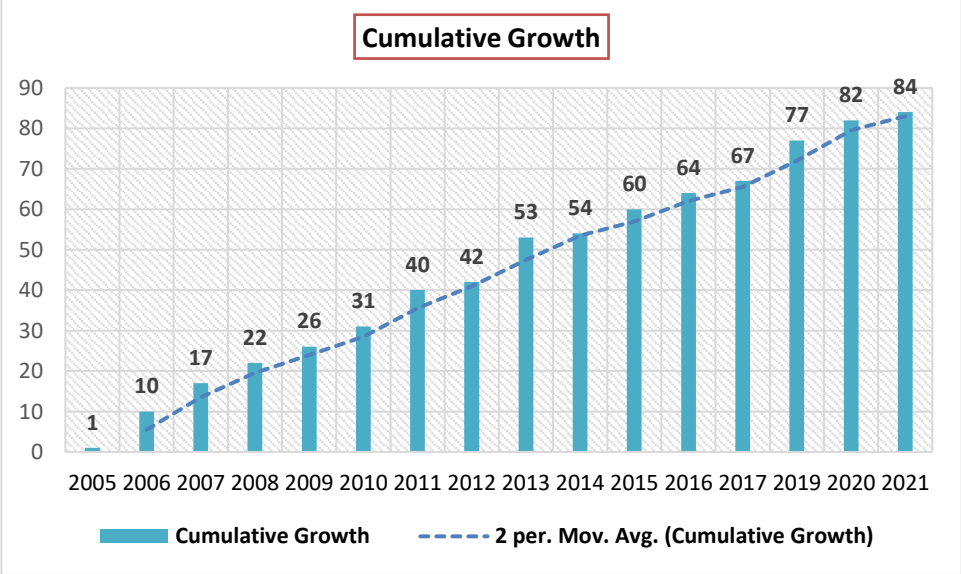

Figure 5: Cumulative Growth of Indian OAIRs

Distribution of OAIRs State Wise

Table 1 highlights the state-wise development of OAIRs in India. Maharashtra secured the first position with 16 (19.05%) IRs, followed by Delhi State with 15 (17.86%) IRs on rank

two, Karnatka state on the third rank with 11 (13.10%) IRs. Though Chandigarh, Haryana, Jammu and Kashmir, and Jharkhand are the least contributor states, each with only one OAIR.

Table 1: Distribution of OAIRs State Wise

SN	State	No. of OAIRs	Percentage
1	Maharashtra	16	19.05
2	Delhi	15	17.86
3	Karnataka	11	13.1
4	Gujarat	7	8.33
5	Kerala	6	7.14
6	Telangana	5	5.95
7	Uttar pradesh	4	4.76
8	Odisha	3	3.57
9	Tamil Nadu	3	3.57
10	Uttarakhand	3	3.57
11	West Bengal	3	3.57
12	Goa	2	2.38
13	Punjab	2	2.38
14	Chandigarh	1	1.19
15	Haryana	1	1.19
16	Jammu and Kashmir	1	1.19
17	Jharkhand	1	1.19
	Total	**84**	**100**

Repositories according to their Software

According to the result *(see figure 6)*, OAIRs in India use four different types of software, viz. DSpace, Drupal, E-prints, and Greenstone. DSpace is the most popular software among these four, adopted by 58% (49) of the total. E-prints is the second most common (34% or 29), followed by Drupal and Greenstone, each with 1%. 3% of repositories have not indicated their software, and 2% are using other than the software mentioned above.

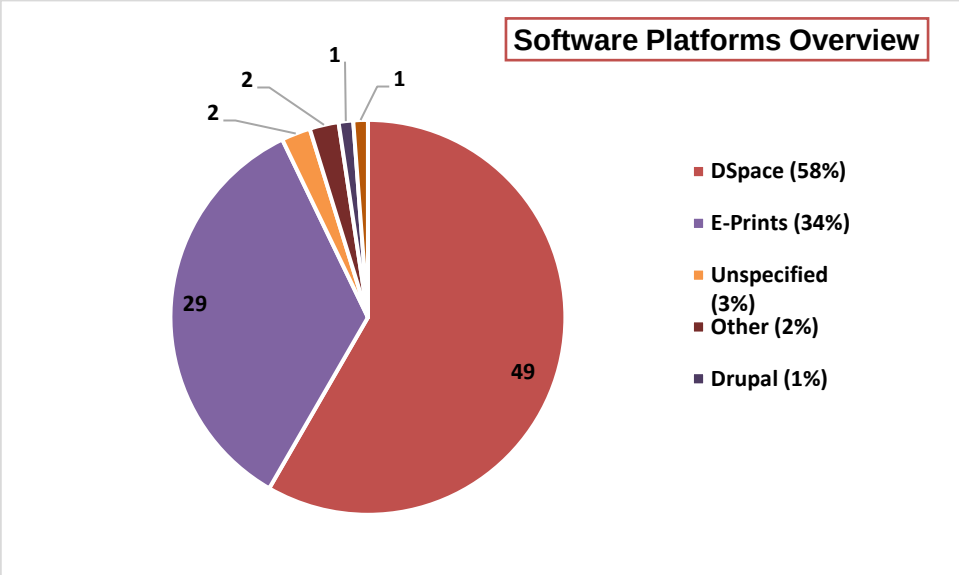

Figure 6: Software Platforms Overview

Repositories according to their Contents

After analyzing the statistics from openDOAR, it was observed *(see figure 7)* that the Indian OAIRs deposit a total of 12 different types of content. The majority of the repositories (i.e. 58 or 70.73%) covered Journal Articles, followed by Theses & dissertations, Conference & workshop papers with coverage of 44 (53.65%) & 38 (46.43%), respectively. Datasets with 0.02% (2) is the least covered one.

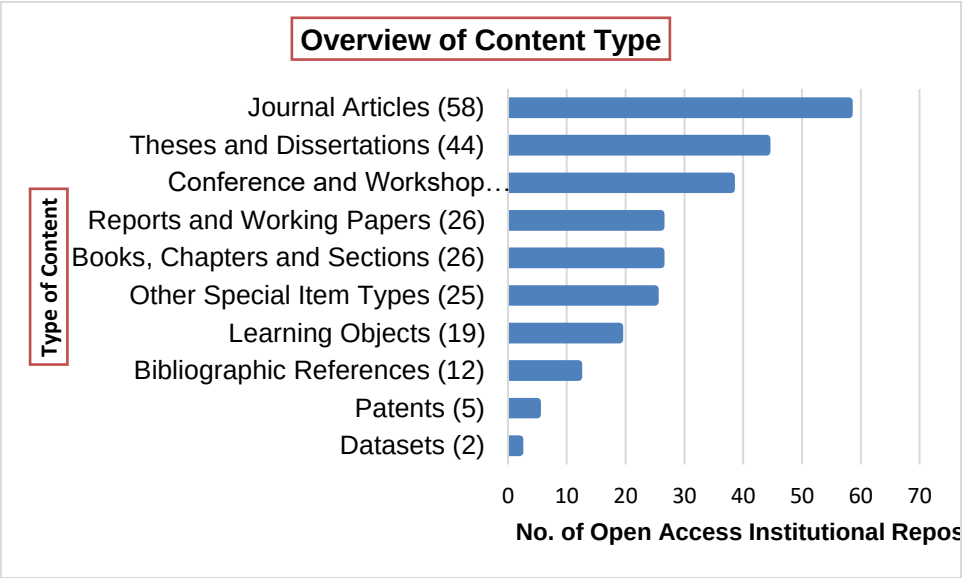

Figure 7: Overview of Content type

Repositories according to their Subject Area

If the subject area of the Indian OAIRs is considered, the majority revealed the coverage of multidisciplinary aspects or includes more than one type of subject area (if specified). Out of the total 24 types of different subject areas identified from OpenDOAR *(see figure 8)*, the majority of the repositories (46 or 54.76%) are Multidisciplinary. Again, subject areas like Law & Politics and Education under Social Science General are the least covered (1 or 1.19%) among all.

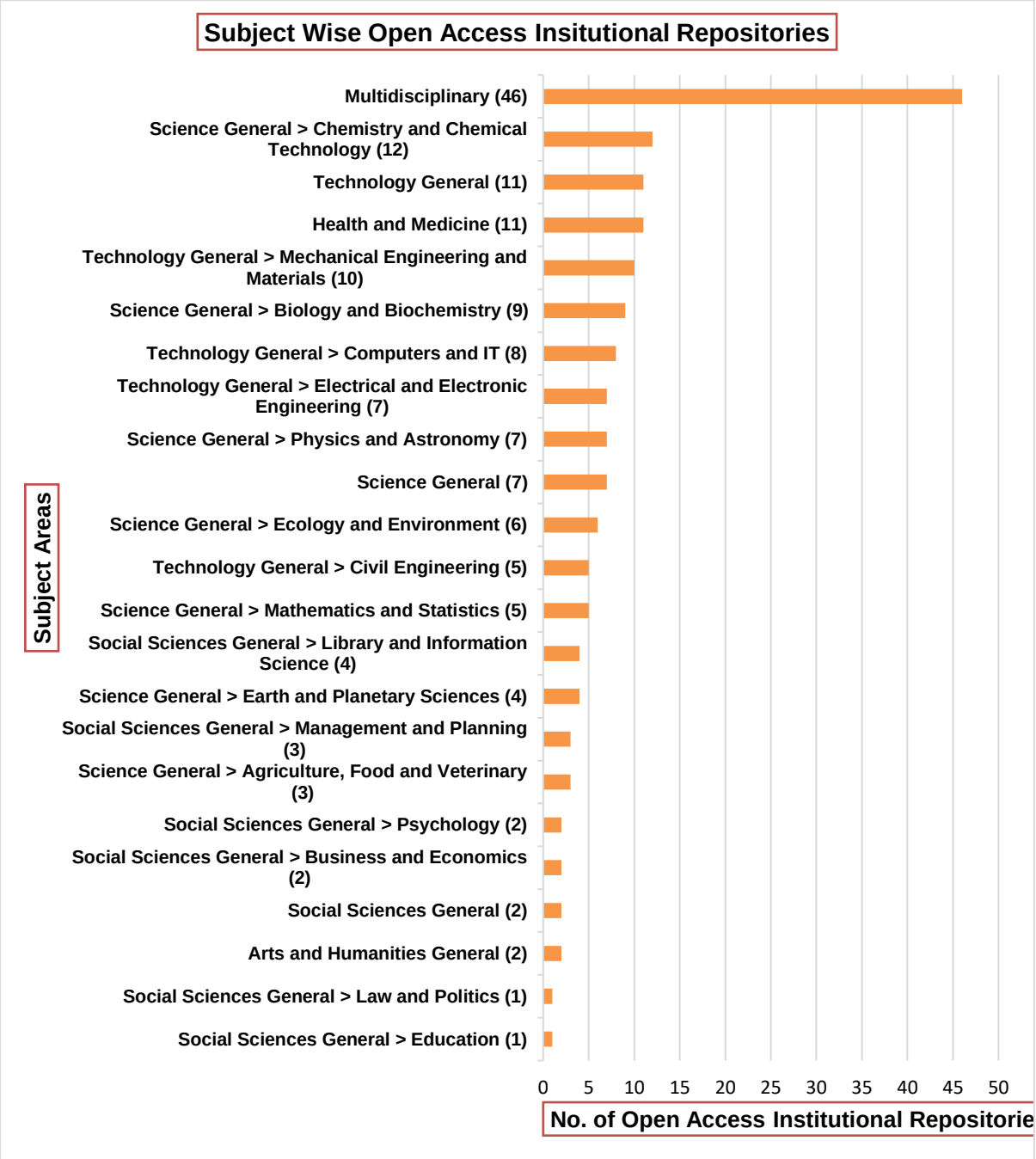

Figure 8: Subject Wise Open Access Institutional Repositories

Repositories according to their Language

The current study revealed that the Indian OAIRs cover content in more than one language in their repository. Out of 10 differently identified languages *(see figure 9)*, the majority of the repositories (96.43%) among 84 provide their content in English, followed by Hindi used by 6 (7.14%) repositories. On the other hand, contents with Sanskrit, Kannada, Gujrati, Bengali & Arabic languages covered by a single repository each.

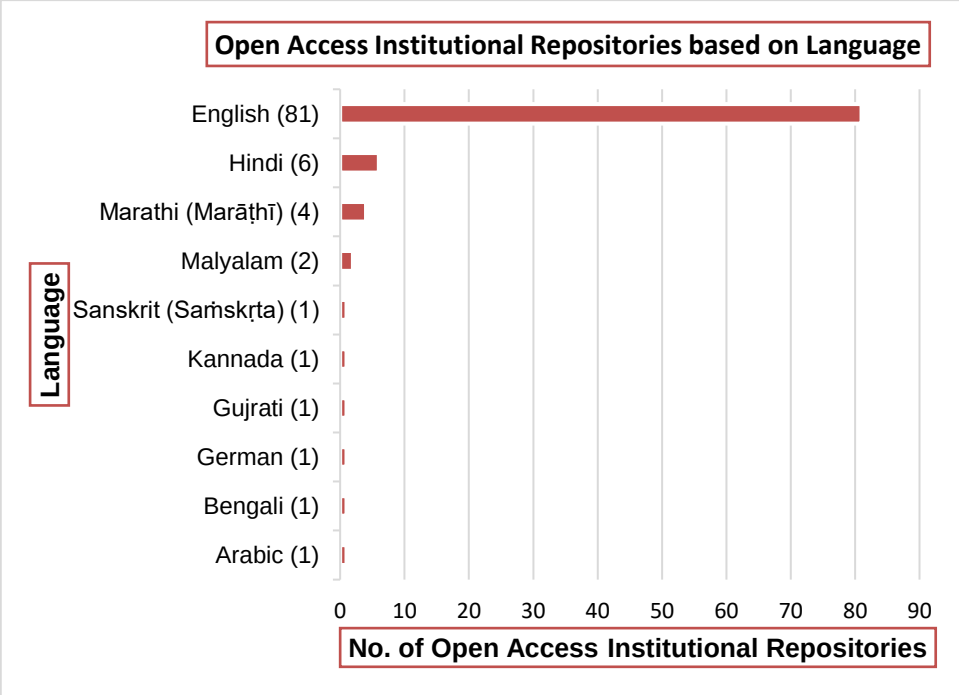

Figure 9: Open Access Institutional repositories based on Language

Repositories according to their last date of modification

To cope with the latest technology & requirements and to prevent from being obsolescence, timely updation & modification of the repositories is important. The study inferred that most of the OAIRs (61 or 72.62%) undergo a recent modification on 18 February 2021. The second most recent modification was done on 23 November 2020 by only one repository and two repositories not specified their last date of modification. The rest of the 29 repositories have not been modified since 2019 as per the stats provided by OpenDOAR *(see figure 10)*.

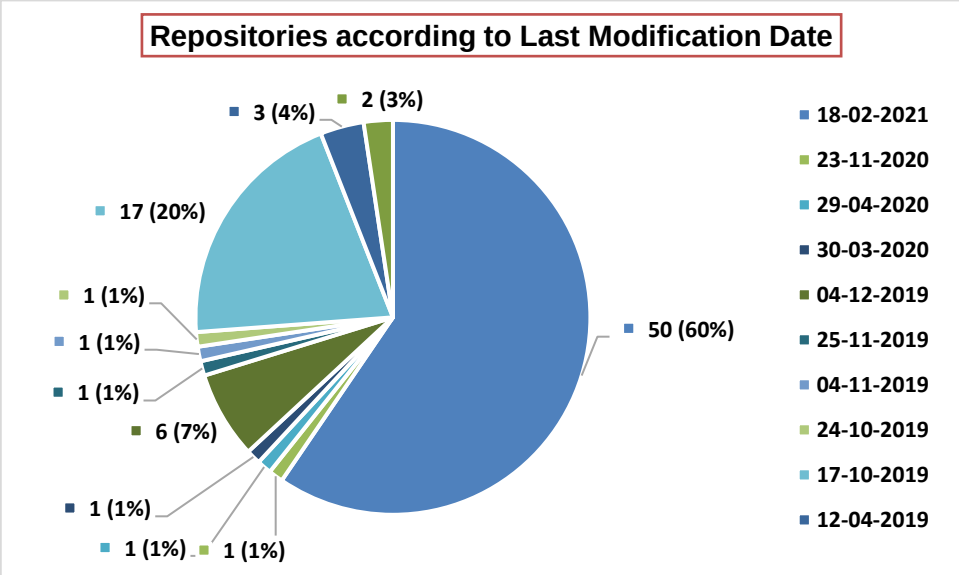

Figure 10: Repositories according to Last Modification Date

RESULTS OF THE SURVEY

After the survey done, the survey data was collected & imported as a *.csv* file (Google sheet) for further analysis and visualization using spreadsheet software. It aims to organize, classify and summarize the data being collected for better comprehension and interpretation leading to understand and explore answers or solutions to the survey questions (SQs) which originally triggered the research.

SQ 1: Are you aware about the Open Access Insitutional Repository (OAIR), OpenDOAR AND ROAR?

The primary purpose of the user's study is to identify the effectiveness of OAIRs in the academic & education system. To find out the actual user & to set the target group concerning their richness & value, SQ1 provides a platform to judge the awareness of the sample users about OAIR, OpenDOAR & ROAR.

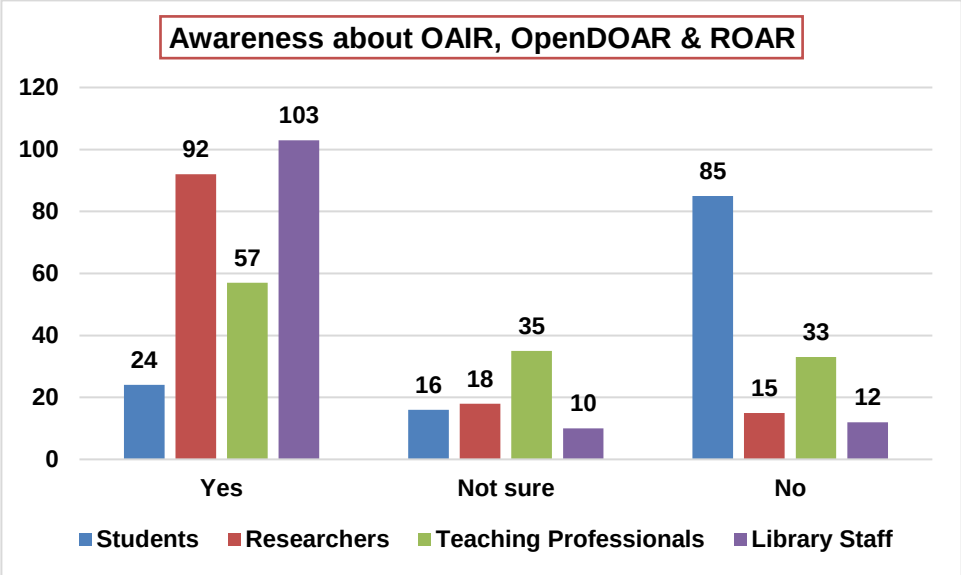

Figure 11: Awareness about OAIR, OpenDOAR & ROAR

From figure 11, it is identified that the Students with a 19.2% (24) awareness rate are the least valuable users among the four. On the other hand, most of the Library Staff 103(82.4%) are aware of OAIR, OpenDOAR & ROAR, followed by Researchers (92 or 73.6%) & Teaching Professionals (57 or 45.6%). For future reference, it can be noted that the students of all streams should be awared about the OAIR & its benefits in the digital era through webinars, workshops & other outreach programmes.

SQ 2: How frequently do you visit OAIR during COVID-19 Pandemic?

In this pandemic period, the closure of educational institutions & lack of physical resources caused an increasing demand for OAIRs as a free to use platform with a high volume of e-content. Thus OAIRs become an invaluable resource for all type of target users, viz Student, Researcher, Teaching Professional & Library Staff. SQ 2 deals with the frequency of visiting OAIR during COVID-19.

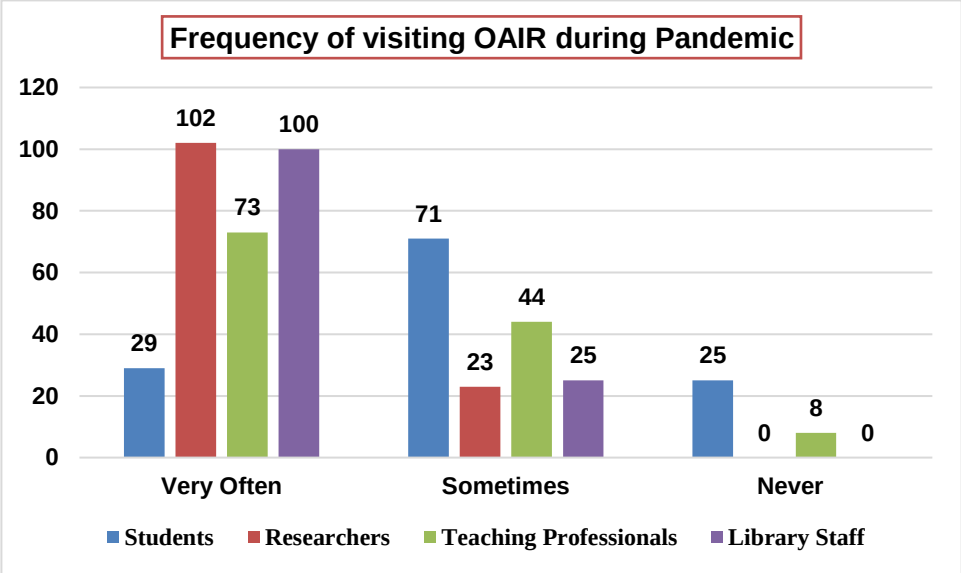

Figure 12: Frequency of visiting OAIR during Pandemic

Figure 12 identifies that under the frequency range "Very Often", 81.6% (102) of Researchers and 80% (100) of Library Staff covered themselves. The percentage is 58.4% (73) for Teaching Professionals and decrease steeply to 23.2% (29) in the case of Students. Moreover, it is also noted that 35.2% (44) of Teaching Professionals visit OAIRs sometimes and 20% (25) of Students never visit OAIRs. This result suggests that only Researchers and Library Staffs visited OAIRs regularly, while Teaching Professionals are moderate visitors and Students are the least one.

SQ 3: Do you think OAIR is an invaluable information source for supporting Academic & Educational system in this "new normal"?

SQ 3 tries to identify the effectiveness of OAIRs to encounter the shifting of the education system from traditional to online, in this current situation of a pandemic outbreak. The study reveals that all the Library staff members agree with this point of view. Also 124(99.2%) Researchers, 103(82.4%) Teaching Professionals & 62(49.6%) Students agrees with SQ3. Unfortunately, only 9 Students and 7 Teachers do not agree with SQ3.

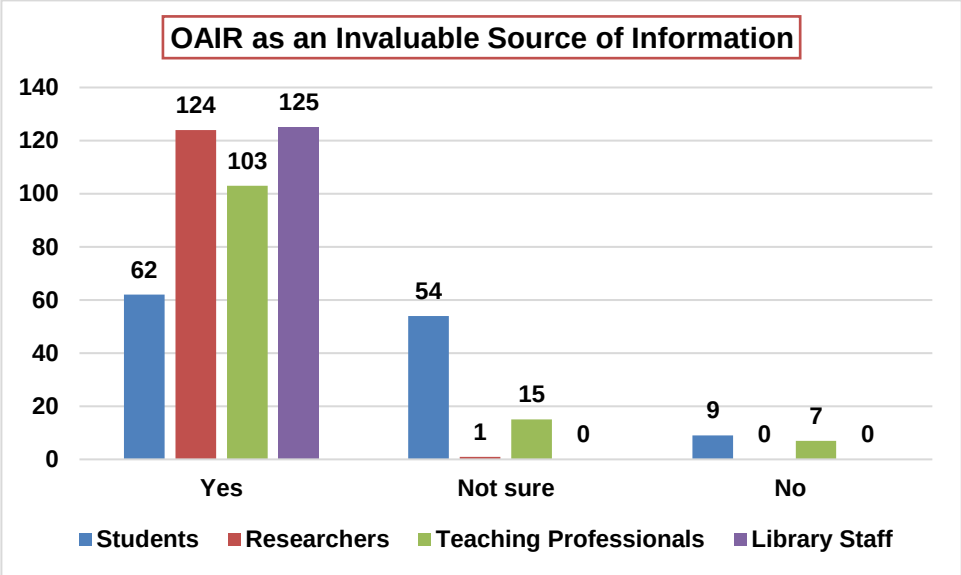

Figure 13: OAIR as an Invaluable Source of Information

SQ 4: In Pandemic situation, what are benefits of An OAIR from user point of view?

To identify the actual benefits of the OAIRs during pandemic, SQ4 structurise as a closed-end question keeping in view different views of the different categories of the target samples. It can be noted from the result that almost all categories of users viz Students, Researchers, Teaching professionals & Library staff agrees that OAIR is free of cost, increase the volume of available material, available anywhere at any time with easily retrievable content. Only some variation observed in the free of copyright and licensing restrictions option.

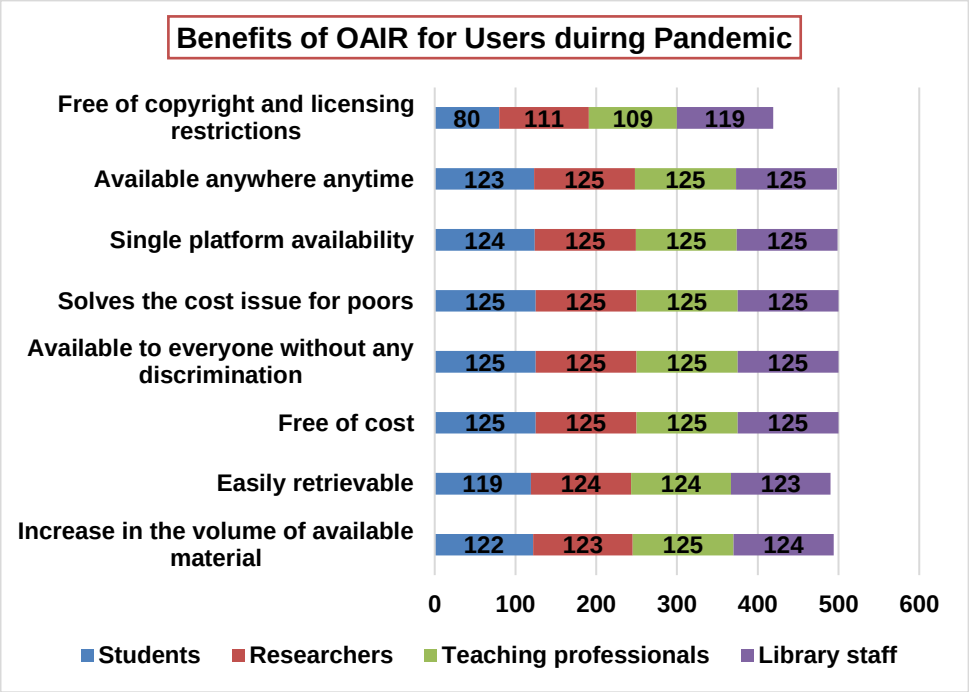

Figure 14: Benefits of OAIR for Users during Pandemic

SQ 5: What type of content do you search in an OAIR during Pandemic period?

SQ5 is another closed-end question that examined which type of contents searched most during this pandemic period. The selection of the options for SQ5 purely based on the commonly available content types of Indian OAIRs in OpenDOAR.

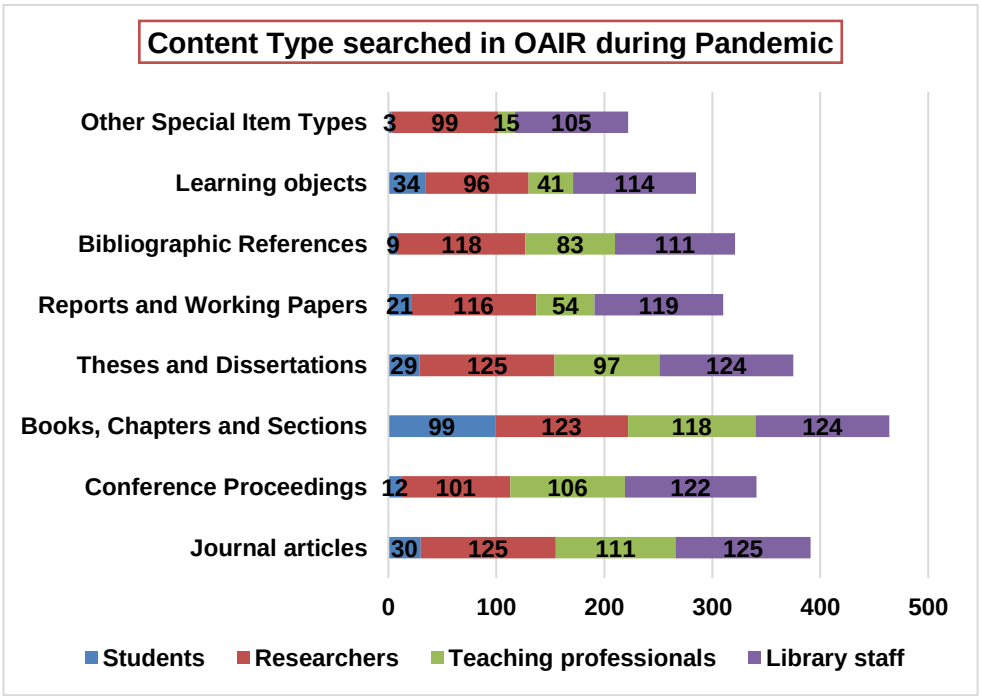

Figure 15: Searched Content type in OAIR during Pandemic

Figure 15 shows that Researchers and Library Professionals are the most frequent visitors of each of the contents listed in SQ5. Overall, surprisingly Books, Chapters & Sections are searched most (92.8%) rather than Journal Article (78.2%), Thesis and Dissertations (75%) or Conference Proceedings (68.2%). These four above-mentioned content types are most widely used by teaching professionals for their teaching-learning purposes, whereas students rely on Books, Chapters, and Sections for their assignments.

SQ 6: In this financially critical situation, do you think OAIR can act as a significance alternate for promoting Web accessibility & eliminate Digital divide?

Due to this recent spike of COVID-19, the Indian economy encounters a steep fall in the fiscal year 2020-21 and badly affected the financial situation of both the employee & the Institution. In this situation of individual-level financial crisis & lack of financial support from the Institution, SQ6 tries to find the efficiency of OAIRs as an alternate to support the academics & education system.

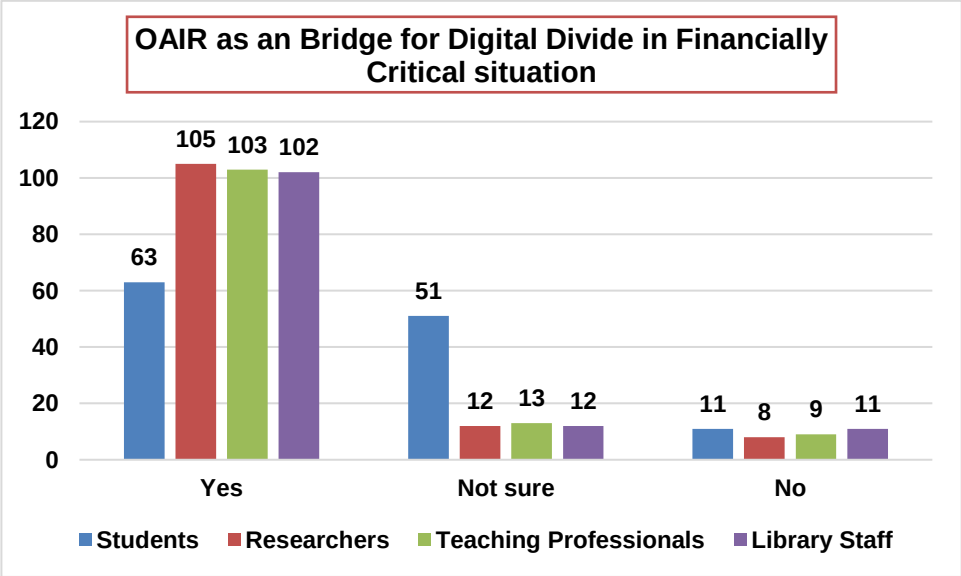

Figure 16: OAIR as an Bridge for Digital Divide in Financially Critical situation

It can be observed from figure 16 that 84% (105) Researchers, 82.4% (103) Teaching Professionals, 81.6% (102) Library Staff and 50.4% (63) Students agrees with the view that by making content freely accessible on the web, OAIRs act as a bridge to fill the gap of the digital divide in this online study system.

SQ 7: Are you aware of the copyright agreement signed with the publishers while publishing in Open access Institutional Repository?

Availability of a sufficient amount of scholarly content is an essential requirement to make any OAIR successful. So, it is necessary to have a look at the awareness of the copyright agreement signed with the publishers while publishing in an OAIR.

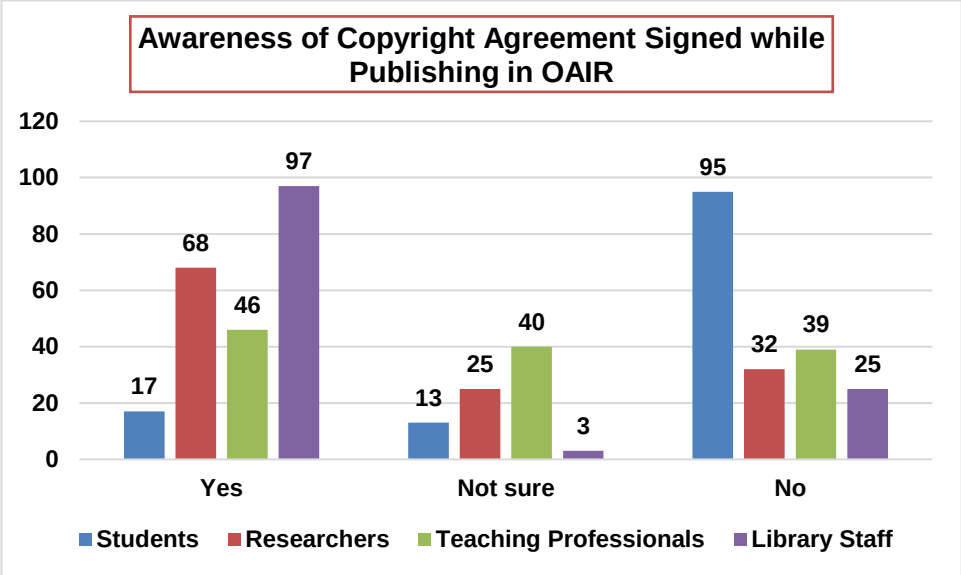

Figure 17: Awareness of Copyright Agreement Signed while Publishing in OAIR

Figure 17 reveals that Library Staff being the information providers are the most knowledgeable about the copyright agreement while publishing in OAIR lead by Researchers. Nearly 77.6% (97) of Library Staff admitted that they have sufficient knowledge about this copyright agreement. While the percentage is 54.4% (68) for the Researchers & 46(36.8%) of Teachers are aware of the same. Unfortunately, most of the students (76%) are unaware of this copyright agreement due to a lack of practical knowledge.

SQ 8: Do you know SHERPA RoMEO (http://www.sherpa.ac.uk/romeo) provides a useful quick reference guide for you to check on open access and self-archive restriction and policies with links to publishers' websites?

SQ 8 deals with the awareness of SHERPA RoMEO among different categories of targeted samples. And results from the survey are not up to the mark as expected. It can be seen from figure 18 that more than 70 respondents from each category except Library Professional lack knowledge of SHERPA RoMEO. And some of them are not sure. Just 63.2% (79) of Library Professionals are aware of this website, which is a disappointing response even though this is the most aware category among all others. And students are the category with the least knowledge of the same.

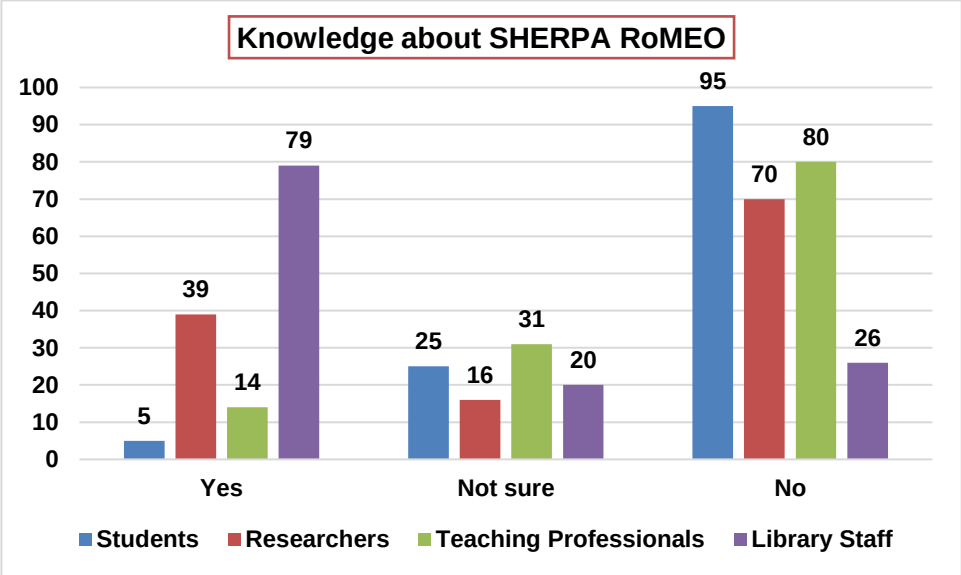

Figure 18: Knowledge about SHERPA RoMEO

SQ 9: How OAIR helps library professionals in improving their services during Pandemic?

Free and easy to access characteristics of OAIRs with a large volume of contents helps library professionals to cope up with the new trend of information request during this pandemic situation. Though primarily, it can be assumed that SQ9 is intended only for library professionals, the users' of the service also acquire some knowledge of the same. Students, researchers, teaching professionals, and other library staff benefit from the services provided by Library Professionals. In this lockdown period and financially critical situation OAIR has eased the work of Library professionals to a great extent. Each of the eight options of SQ9 gets at least more than 100 responses from each category. It acknowledges that OAIRs are a boon to library services in this financially precarious situation, supporting teaching, learning, and research by providing single-platform access to voluminous content.

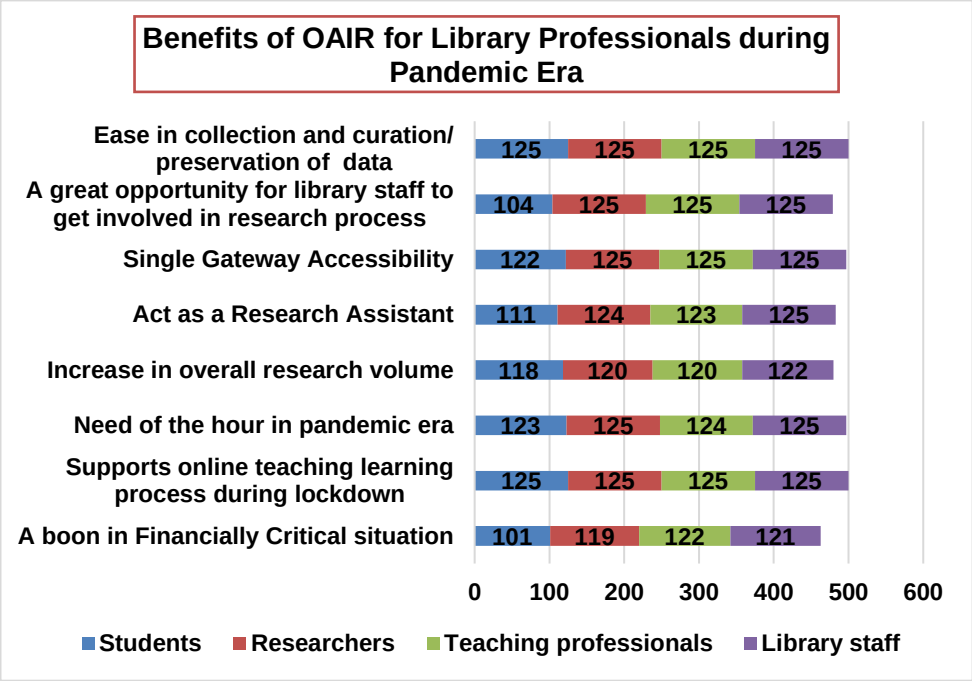

Figure 19: Benefits of OAIR for Library Professionals during Pandemic Era

SQ 10: Compare the effectiveness of an OAIR in different situations (1 to 5)

A comparative analysis was conducted using SQ10 to compare the effectiveness of Indian OAIRs during different Pre-Pandemic, Pandemic and Post-Pandemic Period. Only the regular and known users of OAIRs can do some value addition to the research question. Figure 20 illustrates that OAIR was most effective for researchers and library staff during the pre-pandemic era, but its effectiveness for students and teaching professionals increased at a faster pace during the pandemic period. Additionally, the effectiveness of OAIR during Pandemic and Post Pandemic Period is almost similar for all categories.

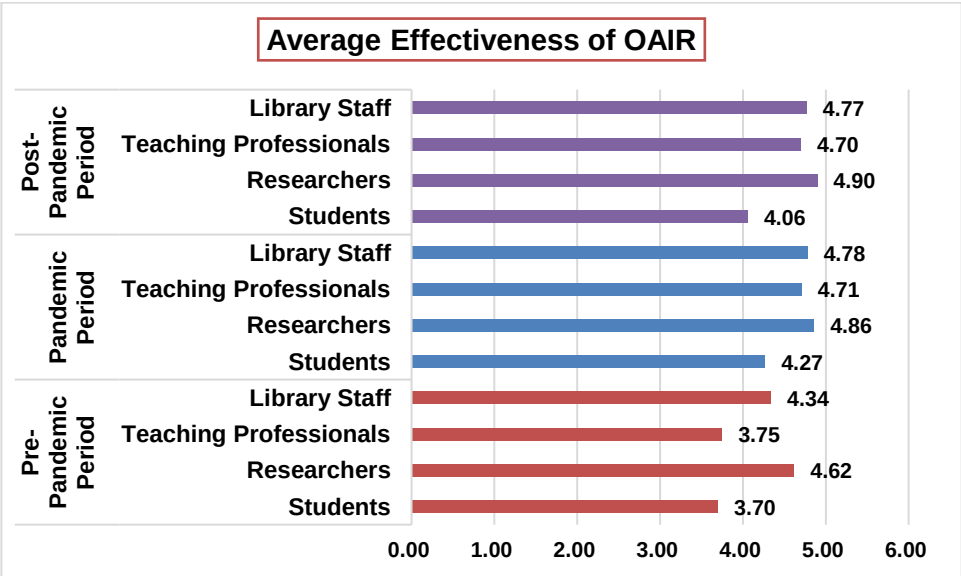

Figure 20: Average Effectiveness of OAIRs in Different Time Period

KEY FINDINGS OF THE STUDY

- It can be revealed from the study that according to OpenDOAR database there are total of 84 OAIRs in India. Most of them are using DSpace and E-Print software.
- There is a consistent growth of Indian OAIRs in OpenDOAR and most of them are updated with time.
- Teaching professionals required to give more importance towards the usage of OAIRs and students need more awareness about the benefits of it.
- OAIR effective during COVID-19, need to aware publishers about copyright, publishing policies of Open Access Institutional Repositories, and SHERPA RoMEO.
- Indian OAIRs played a significant role in promoting web accessibility and eliminating digital divide in this changing system of education.
- During pandemic an invaluable source of information specially in era of digital India.
- Repositories should focus more on the other types of content along with the Journal articles and theses & dissertation to attract more students and teaching facility and should provide content in other Indian languages too other than English

CONCLUSION

In the face of the COVID-19 pandemic, the utility and necessity of OAIRs have manifolded in India. Indian OAIRs have been effective during the pandemic in assisting online teaching by providing open access resources without discrimination at zero cost. In this way, OAIRs helped in eliminating the digital divide in this financially critical situation. The study revealed that the regular updation of Indian OAIRs make them suitable for every single change made in the Indian Education system. Furthermore, the availability of diverse content types in a variety of subject categories aids the Indian OAIRs in enriching a knowledge base for academics.

Now, while organisations such as UNESCO are developing an existing mandate on guaranteeing universal access to information in the fight against COVID-19 (UNESCO 2020), some academics may be hesitant to initiate open accessibility due to concern of disrupting excellent ties with their publishers (Adolphus 2009). In this situation, an institution should promote the building of OAIRs as an essential mandate to digitally archive the intellectual product created by the faculty, research staff, and students of the institution and freely accessible to end users both within and outside of the institution (Narayana, Biradar, and Goudar 2006). But still, there is a need to conduct various awareness programs about OAIRs to attract more users, especially the students and teachers. Moreover, institutions should amend regulations for their researchers & academicians to publish institutional funded research in an open-access journal/database.

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Digital Repository for English Language Teaching and Learning Resources: A Panacea in the Time of the Pandemic

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ABSTRACT
The Coronavirus disease 2019 (COVID-19) pandemic poses a huge challenge to the education system in Malaysia. During this critical time, schools were closed and teachers were required to conduct lessons via the online platform. Thus, the use of digital teaching resources increased exponentially as these resources made lessons more effective and also more interesting. As these resources had to be systematically stored for easy retrieval, a digital repository prototype was developed specially to support English Language instruction at SMK Canossian Convent (SMKCC), Kluang, Johor. The repository facilitates the systematic storage and easy retrieval of the image, text and video collections of the English Language teaching and learning resources using the DSpace system. This was implemented using the ADDIE model which consists of five phases, namely analysis, design, development, implementation and evaluation. A total of 75 teaching and learning resources were uploaded into the system, accompanied by selected Dublin Core metadata fields which include Title, Author, Keyword, Issue Date, Publisher, Description, Uniform Resource Identifier (URI), Type and Language. A survey to evaluate the level of satisfaction was then carried out among users of this digital repository prototype. The results showed that 100% of the respondents found the digital repository useful, easy to use, easy to learn, and were satisfied in using it to browse, search and retrieve any particular item stored in the collection. This project has, indeed, delivered a good prototype of the digital repository service to the targeted users. Suggestions from users were noted for project improvement and future development of the digital repository.

Keywords: Digital repositories; DSpace; ADDIE model; Dublin Core metadata; English Language instruction

INTRODUCTION

On 11 March 2020, the World Health Organisation (WHO) declared the Coronavirus disease 2019 (COVID-19) outbreak a global pandemic (Ghebreyesus 2020). Due to a sharp rise in COVID-19 cases in the country, the Malaysian Prime Minister, Tan Sri Mahiaddin Yassin officially implemented the 'Movement Control Order' (MCO) on 18 March 2020 (Sukumaran 2020). During this pandemic, schools in Malaysia were closed indefinitely as a way to protect students from COVID-19 infections and to prevent the disease from

spreading in the community (Soo 2020). With the closure of all schools, teachers had to use available technologies and conduct teaching via the online platform (Razak 2020). They had to be creative and innovative in overcoming the limitations of online teaching and in ensuring that e-learning was effective (Othman et al. 2020; Pokhrel and Chhetri 2021).

Prior to the COVID-19 pandemic, the English Language teachers of SMK Canossian Convent (SMKCC), Kluang conducted face-to-face lessons and occasionally used digital resources available on several platforms, websites or portals such as the Johor English Digital Learning Resources (JEDLR), British Council, Teach-This.com, All Things Grammar and YouTube. These resources had to be carefully selected for lessons to be effective and interesting so as to achieve their learning objectives. During the MCO period, the use of these available digital resources has become even more popular among teachers conducting online teaching as it helps overcome the problem of having limited time to prepare individual online learning content (Huang et al. 2020).

Every English Language teacher has their collection of resources stored in electronic folders in the computer or on external hard disk for future use. The English Language teachers faced various technical problems trying to locate the resources that were stored earlier. Firstly, these resources were not localised; they were scattered, and not well-organised. Secondly, no standard metadata was used when storing these resources. Information about the resources was either not stated or was too brief, that is, only the folder name or the file title was available. Thirdly, item retrieval was time-consuming as the teachers had to select the folder, and then browse through the files according to the level and title. When these titles were renamed, the time taken for the retrieval of the items was much longer. Fourthly, redundancy due to multiple storages occurred when teachers saved the resources which already existed in their computers under a different file name. Lastly, the problem of accessibility arose when teachers, while working in school, wanted to access the image, text and video collection of resources stored earlier but did not bring their computer or external hard disk to school.

It was apparent that there was a need for a simple yet centralised and integrated system where good and effective teaching and learning resources could be pooled together, systematically stored in a specific location for easy retrieval, and shared among the teachers. Discussions with their English Language Department Head led to the decision to establish a digital repository as a database to store and manage the digital collection of teaching and learning resources. The resources to be included in this repository were Examination Questions, Fun Learning Activities and Writing Genres. Therefore, this research project aims to develop a digital repository prototype using DSpace for the image, text and video collections of teaching and learning resources of the English Language Department of SMKCC Kluang. The development of the digital repository prototype in this research project is to enhance item retrieval of the English Language teaching and learning resources.

OBJECTIVES

The purpose of this paper is to describe the development and use of a digital repository for English Language teaching and learning materials during the COVID-19 pandemic. The objectives of the study are as follows:

1. To develop structured metadata in the digital repository prototype for the image, text and video collections of the English Language Department's teaching and learning resources in SMKCC Kluang.
2. To develop a digital repository prototype for the image, text and video collections of the English Language Department's teaching and learning resources in SMKCC Kluang using the DSpace system.
3. To evaluate the level of satisfaction among users of the digital repository prototype in SMKCC Kluang.

LITERATURE REVIEW

Digital Repository

A digital repository is a collection of digital resources which helps to classify, catalogue, store, preserve, disseminate, and provide access to the knowledge assets or intellectual output of their organisations (Das and Chatterjee 2015; Murugan and Ravanan 2015). Digital repositories may be proprietary or open-source. Proprietary software refers to software accessible only to those who have purchased a special licence key. These source codes are not publicly available. On the other hand, open-source software is free and available for anyone to access and modify the source code and therefore is more widely used (Dhir and Dhir 2017). Among the open-source software which are commonly used for the creation of digital repository are DSpace and EPrints, others include Archimede, ARNO, CDSware, Fedora, Greenstone, i-Tor, MyCoRe and OPUS (Das and Chatterjee 2015). To function properly, repositories must be sustainable, trusted, well-supported and well-managed. The benefits of digital repositories are 1) resources are kept in a single, well-organised location; 2) increased visibility of resources; 3) resources are well-preserved and permanently accessible to all (Momin and Gaonkar 2016).

DSpace

DSpace is an open-source repository software that enables the sharing of digital contents (Asorey et al. 2015). It has the largest digital repository user community and developers worldwide and is used by many educational, government, private and commercial institutions (DuraSpace n.d.). First released in 2002 under a Berkeley Software Distribution (BSD) licence, DSpace was jointly developed by the Massachusetts Institute of Technology (MIT) Libraries and Hewlett Packard (HP) Labs (DuraSpace n.d.; Smith 2002). DSpace is written in Java and works on most operating systems including Linux, Mac OSX and Windows. It is built on top of free, open-source tools, such as the Apache Web server, the Tomcat Servlet engine and the PostgreSQL relational database system. The benefits of using DSpace are 1) it is free open-source software; 2) it can be installed 'out of the box'; 3) it can manage and preserve all types of digital content including images, texts and videos; 4) it is customisable to fit one's needs in terms of user interface,

metadata, browse and search configurations, local authentication mechanisms, standards compatibility, database configurations and choice of language (DuraSpace n.d.). However, the limitations of DSpace are 1) it uses a flat-file and metadata structure; 2) it does not support linked data; 3) it has limited reporting capabilities; 4) it has limited application programming interface (API); 5) it is not scalable or extensible (Verma and Kumar 2018). Thus, from the features and benefits mentioned above, DSpace was considered suitable and was, therefore, selected for this research project.

ADDIE Model

ADDIE model consists of five phases which are analysis, design, development, implementation and evaluation as shown in Figure 1. This model was originally invented by the Center for Educational Technology at Florida State University in 1975 to form an instructional systems development program for military training (Branson et al. 1975). Eventually, the model after having undergone modifications became widely used as it is a practical and simple instructional design framework (Aldoobie 2015; Bamrara 2018; Hadi et al. 2017). The analysis phase includes the assessment of needs and the establishment of goals. In the design phase, a comprehensive overview or blueprint is created, outlining how to carry out the instruction to achieve the objectives identified during the analysis phase. In the development phase, every instruction is listed in detail to meet the blueprint created during the design phase. In the implementation phase, all instructions are carried out. Finally, in the evaluation phase, feedback about the program is obtained and improvements to the program of instruction are made (Cheung 2016). Although the ADDIE model is generally an instructional design model, it can be adapted to this research project because of its core elements.

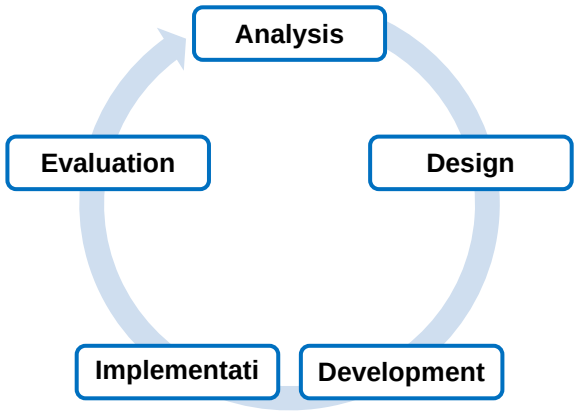

Figure 1: ADDIE Model

Metadata

Metadata refers to data about data (Baca 2016). It provides background information about the resource content, making it easier to retrieve, use and manage the resources (Mukhopadhyay 2015). There are three main types of metadata: descriptive metadata, structural metadata and administrative metadata. Descriptive metadata describes the

details about the content and form of the resource for discovery and identification. Structural metadata describes the details about the way data elements are organised in terms of their relationships and the structure they exist in. Administrative metadata describes the details required to manage the resource, including access and rights management as well as resource preservation information (Prabhune et al. 2017). To model these different types of metadata, various metadata standards are available such as Dublin Core, Machine Readable Cataloguing (MARC), Text Encoding Initiative (TEI), Metadata Encoding and Transmission Standard (METS) and Preservation Metadata Implementation Strategies (PREMIS) (Mukhopadhyay 2015). For this project, the Dublin Core metadata standard was applied in the digital repository prototype. This metadata consists of fifteen metadata fields which are Title, Author, Keyword, Issue Date, Publisher, Description, Contributor, Uniform Resource Identifier (URI), Type, Format, Source, Language, Relation, Coverage and Rights (Riley 2017).

METHODOLOGY

The development process of this digital repository guided by the ADDIE model consists of the analysis, design, development, implementation and evaluation phases.

Analysis

The eight English Language teachers participating in this project were asked to answer a needs analysis questionnaire in an effort to obtain more information from them. Based on their responses, it was found that all eight teachers (100%) faced problems when searching for and locating teaching and learning ideas and resources online. They agreed that a digital repository would be a valuable tool if it could preserve the teaching and learning resources of the school in a central location for resources to be shared among all the English Language teachers of the school. All of them were willing to contribute teaching and learning ideas and resources to this digital repository as they believed that this digital repository could allow for the long-term preservation of selected teaching and learning resources, and for the addition of new resources from time to time. For this digital repository, 7 out of 8 of the teachers (87.5%) chose to focus on teaching and learning resources for teachers' references instead of students' references. The results of the survey showed that the main focus of the teachers were Examination Questions (75%), Fun Learning Activities (62.5%), Writing Genres (50%) and 21st-Century Learning Ideas (25%). Hence, the three categories chosen for this project were Examination Questions, Fun Learning Activities and Writing Genres, that is, only images, texts and videos of teaching and learning resources that fell under the above three categories would be selected. All the teachers except one (87.5%) were willing to participate as charter members to develop a digital repository at SMKCC Kluang.

Design

In the design phase, the selected resources were placed into their designated folders according to the category of the collection as shown in Figure 2. These resources were then renamed with alphanumeric classification codes (generated from the category and level of collections) at the beginning of the file name, followed by the teaching and

learning resource title. For example, the file FLA F4-5 SPEAKING ACTIVITIES FOR ESL – 10 BEST SPEAKING ACTIVITIES EVERY TEACHER SHOULD KNOW; 'FLA' is the category code created for Fun Learning Activities, 'F4-5' is the level code for Form 4 to Form 5, and 'SPEAKING ACTIVITIES FOR ESL – 10 BEST SPEAKING ACTIVITIES EVERY TEACHER SHOULD KNOW' is the resource title.

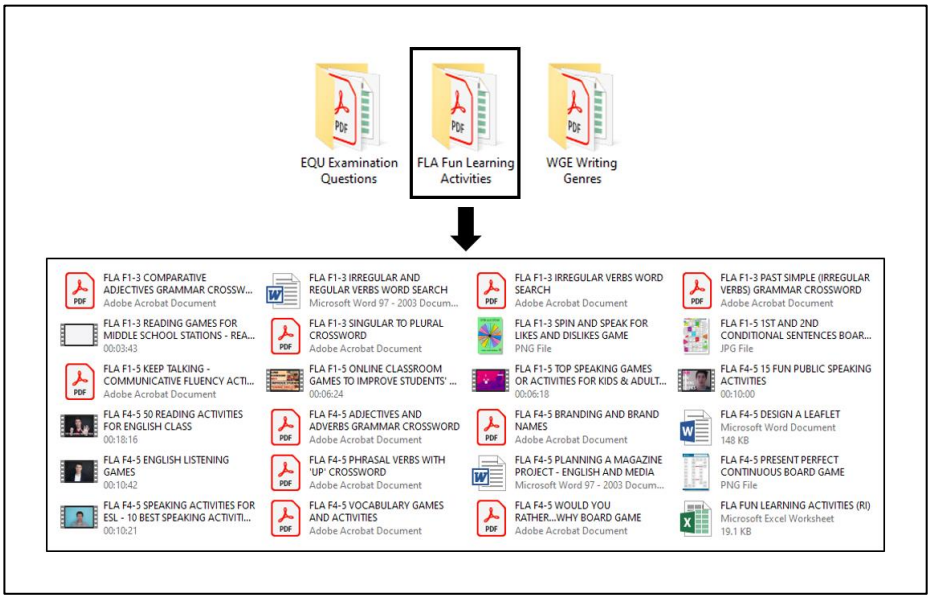

Figure 2: Folder Storage in the Computer before Setting-Up the Digital Repository

Finally, the metadata or repackaged information (RI) files for the collections of teaching and learning images, texts and videos were created using Microsoft Excel. Figure 3 shows an example of a metadata or RI file.

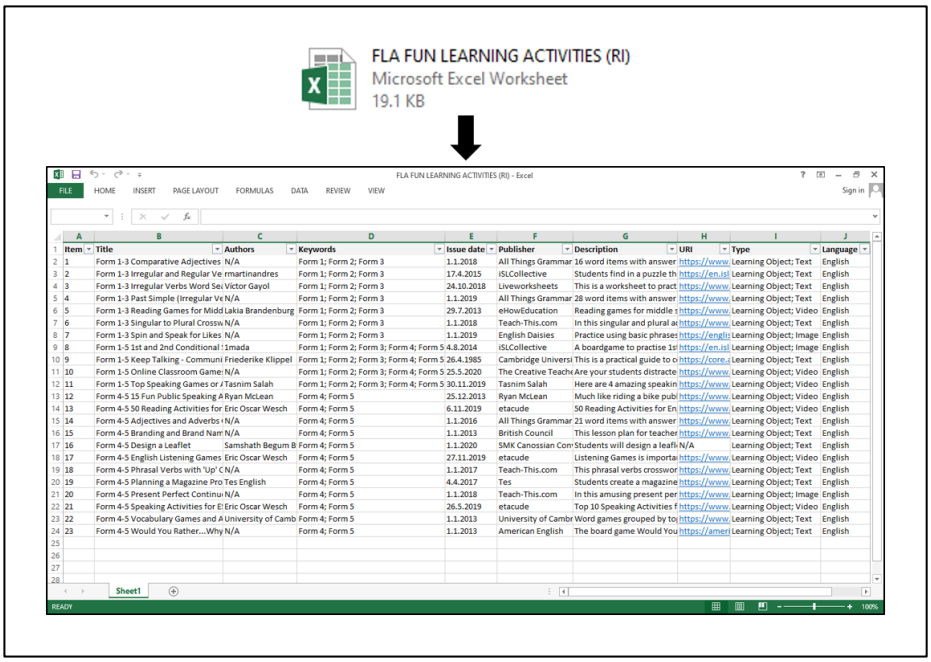

Figure 3: Example of a Metadata or RI File Created Using Microsoft Excel

Development

The first step in the development phase was the installation of all prerequisite software into the laptop computer. Details of the system requirements in this project are shown in Table 1.

Table 1: System Requirements

System	Requirement	Description
Hardware	Laptop computer	Computer running on 64-bit Windows
Software	Java SDK	jdk1.8.0_111
	PostgreSQL	postgresql-9.5.22-1
	Apache Tomcat	apache-tomcat-9.0.0.M13
	Apache Ant	apache-ant-1.9.15
	Apache Maven	apache-maven-3.3.9
	DSpace	dspace-6.3-src-release

Subsequently, the dspace.cfg file in the DSpace folder was edited using Notepad++ to create the digital repository for this project. Changes made in the dspace.cfg file are shown in Table 2.

Table 2: Changes Made in dspace.cfg File

Targeted line	Changes made
dspace.dir	C:/dspace
dspace.ui	jspui
dspace.name	Digital Repository for the English Language Teaching and Learning Resources in SMK Canossian Convent Kluang

default.language	en
mail.server	tangracehl@gmail.com
mail.from.address	tangracehl@gmail.com
feedback.recipient	tangracehl@gmail.com
mail.admin	tangracehl@gmail.com

The default system administrator was then created followed by the creation of community and collections in the digital repository. Items were registered in the appropriate collection whereby metadata was filled in, resource files were uploaded into the digital repository, and authorisations of data were done. Detailed steps for the creation of a community and a collection as well as registration of an item in DSpace are shown in Appendix 1. The final step was a simple DSpace customisation to eliminate unnecessary features in the default user interface such as jumbotron, introductory text and container banner on the digital repository homepage. Detailed steps for this DSpace customisation are shown in Appendix 2.

Implementation

The digital repository prototype which was developed was then introduced to the target users, that is, the English Language teachers of SMKCC Kluang. They were briefed on how to use the digital repository. To ensure that the digital repository prototype continues to be used and managed well by the teachers, lessons for teachers on the preservation of digital materials were also carried out.

Evaluation

A survey questionnaire was distributed to obtain user-feedback regarding the use of the digital repository prototype to retrieve items in the collection. The USE questionnaire based on Lund (2001) was used for this evaluation. It consisted of 30 questions that were based on four aspects: Usefulness, Ease of Use, Ease of Learning and Satisfaction. The level of agreement was from 1 to 7 in Likert-type scale response anchors. Number 1 indicates strongly disagree, 2 indicates disagree, 3 indicates somewhat disagree, 4 indicates neutral, 5 indicates somewhat agree, 6 indicates agree and 7 indicates strongly agree. Only 10 out of 30 relevant questions were selected for this study. The evaluation session was held in SMKCC Kluang. The tools used consisted of printed copies of the survey questionnaire and a personal laptop computer which had the developed digital repository prototype. The responses from the survey questionnaire were analysed using Microsoft Excel.

RESULTS AND DISCUSSION

Structured Metadata

The first objective of this research project was to develop structured metadata in the digital repository prototype for the English Language Department's teaching and learning resources in SMKCC Kluang. This digital repository prototype used the Dublin Core

metadata standard which is a built-in feature of the DSpace system. The Dublin Core metadata standard has fifteen classic metadata fields but for this project, only nine metadata fields were selected to describe each item namely, Title, Author, Keyword, Issue Date, Publisher, Description, URI, Type and Language as shown in Table 3. This structured metadata was set to enhance the information management of teaching and learning resources. An example of a full item record is shown in Figure 4. Having developed this structured metadata for the teaching and learning resources, the first objective was achieved.

Table 3: Selected Dublin Core Metadata Fields

Dublin Core metadata field	**Namespace syntax in HTML**	**Description**
Title	dc.title	Item name
Author	dc.contributor.author	Creator or originator of the resource
Keyword	dc.subject	Level of collection
Issue Date	dc.date.issued	Resource created or published date
Publisher	dc.publisher	Company or person that prepares and issues the resource
Description	dc.description	Explanation about the content of the resource
URI	dc.identifier.uri	URL of resource origin and item's handle
Type	dc.type	Nature or genre of the resource content
Language	dc.language.iso	Language of the resource

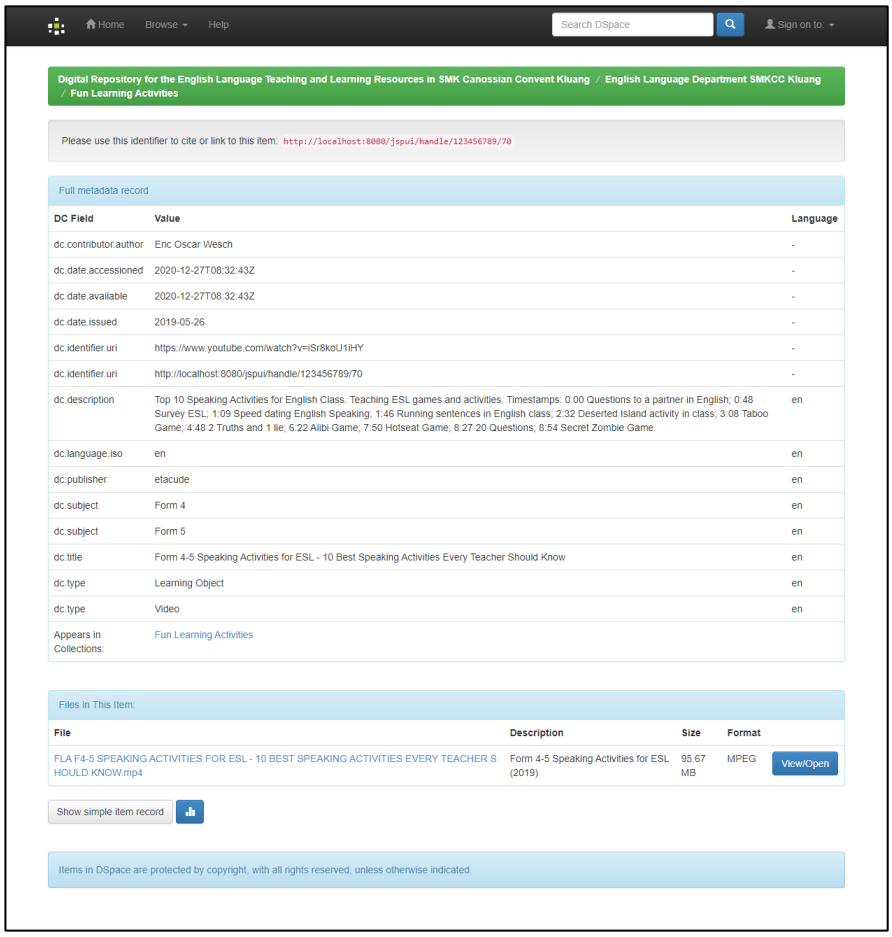

Figure 4: Example of a Full Item Record

Digital Repository Prototype

The second objective of this research project was to develop a digital repository prototype for the English Language Department's teaching and learning resources in SMKCC Kluang using the DSpace system. The digital repository that was built could be viewed via an internet browser after running the Apache Tomcat service under the Administrative Tools of Control Panel. DSpace supports two user interfaces: JavaServer Pages User Interface (JSPUI) and Extensible Markup Language User Interface (XMLUI). The JSPUI web-view was selected for this project and it could be accessed at http://localhost:8080/jspui on the internet browser as shown in Figure 5.

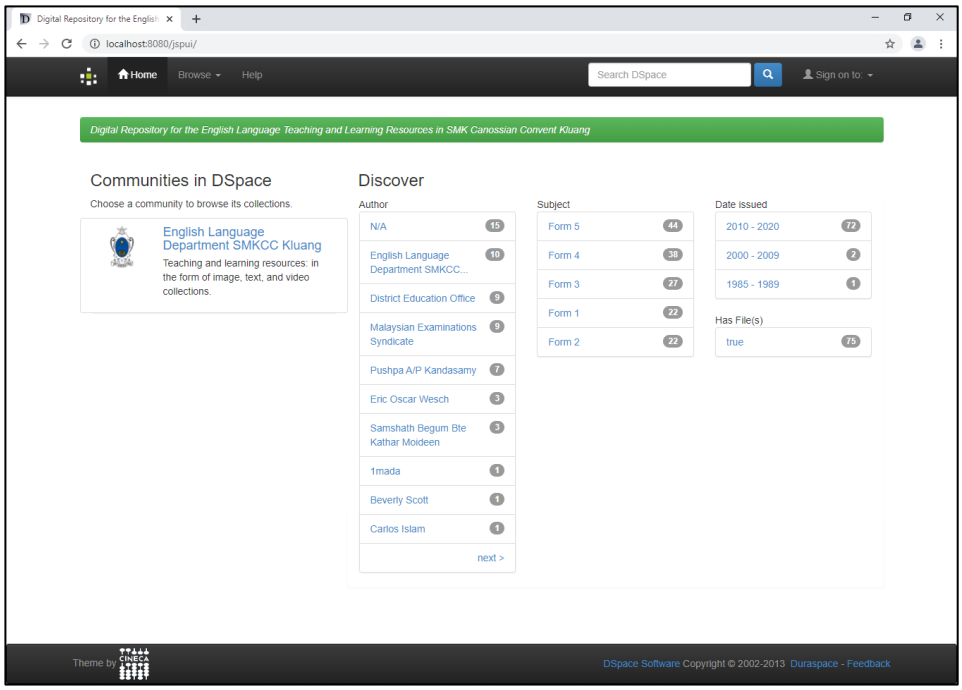

Figure 5: Digital Repository Homepage

Communities that represent parts of the organisation are groups that contribute contents to DSpace. For this project, only one community was created, that is, the English Language Department, SMKCC Kluang. All collections in this community were displayed on the Community page (Figure 6). Alternatively, users can view the collections via the Communities and Collections page as shown in Figure 7.

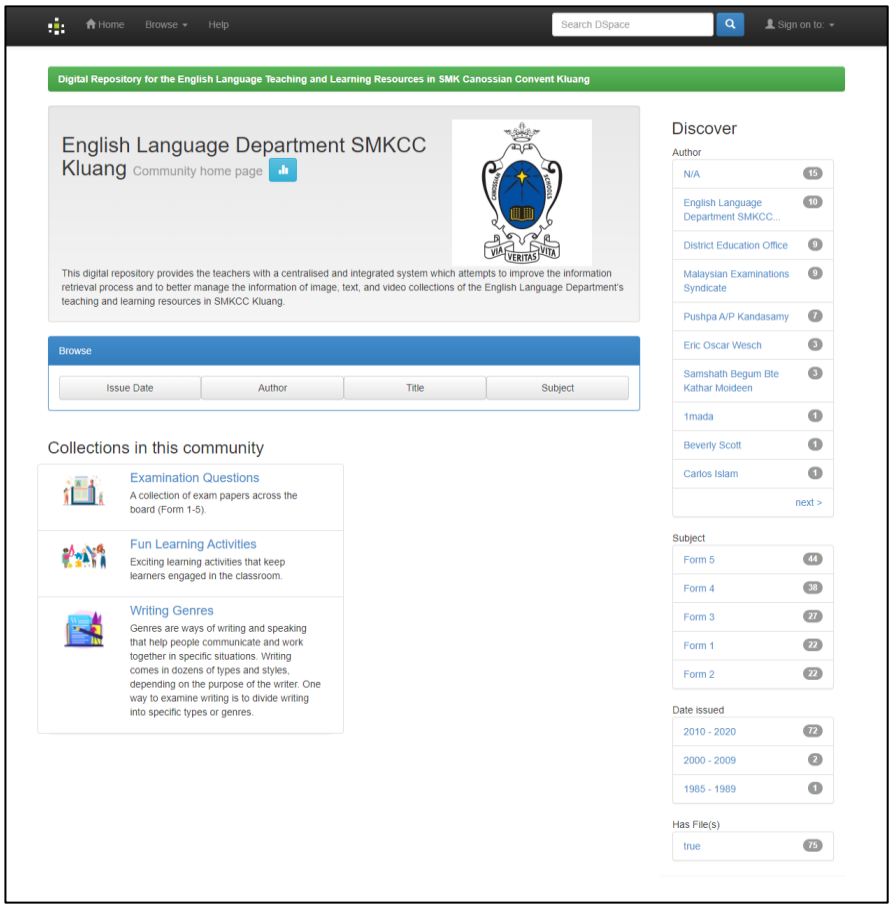

Figure 6: Community Page

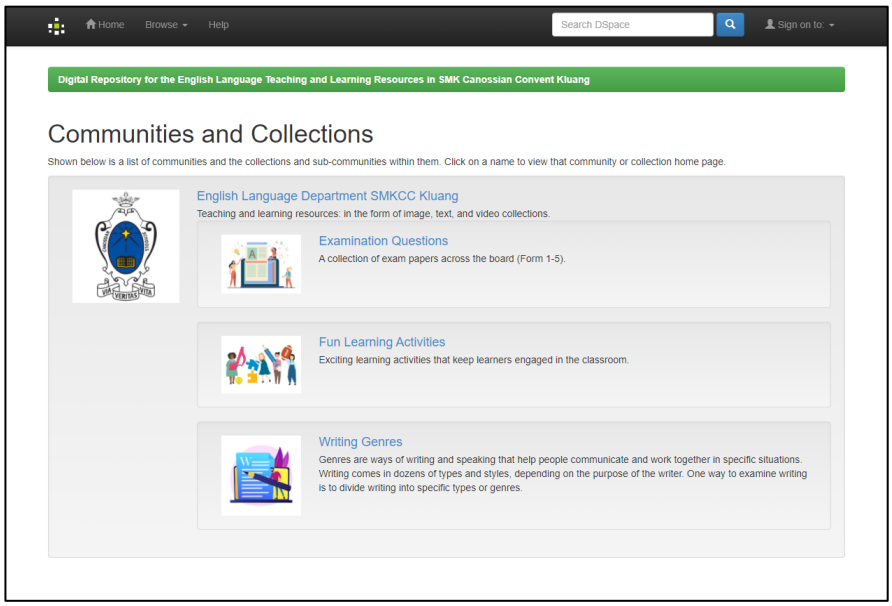

Figure 7: Communities and Collections Page

For this community, three collections were created namely, Examination Questions, Fun Learning Activities and Writing Genres. Users can view the Issue Date, Title and Author(s) of the items on each Collection page. An example of a Collection page is shown in Figure 8.

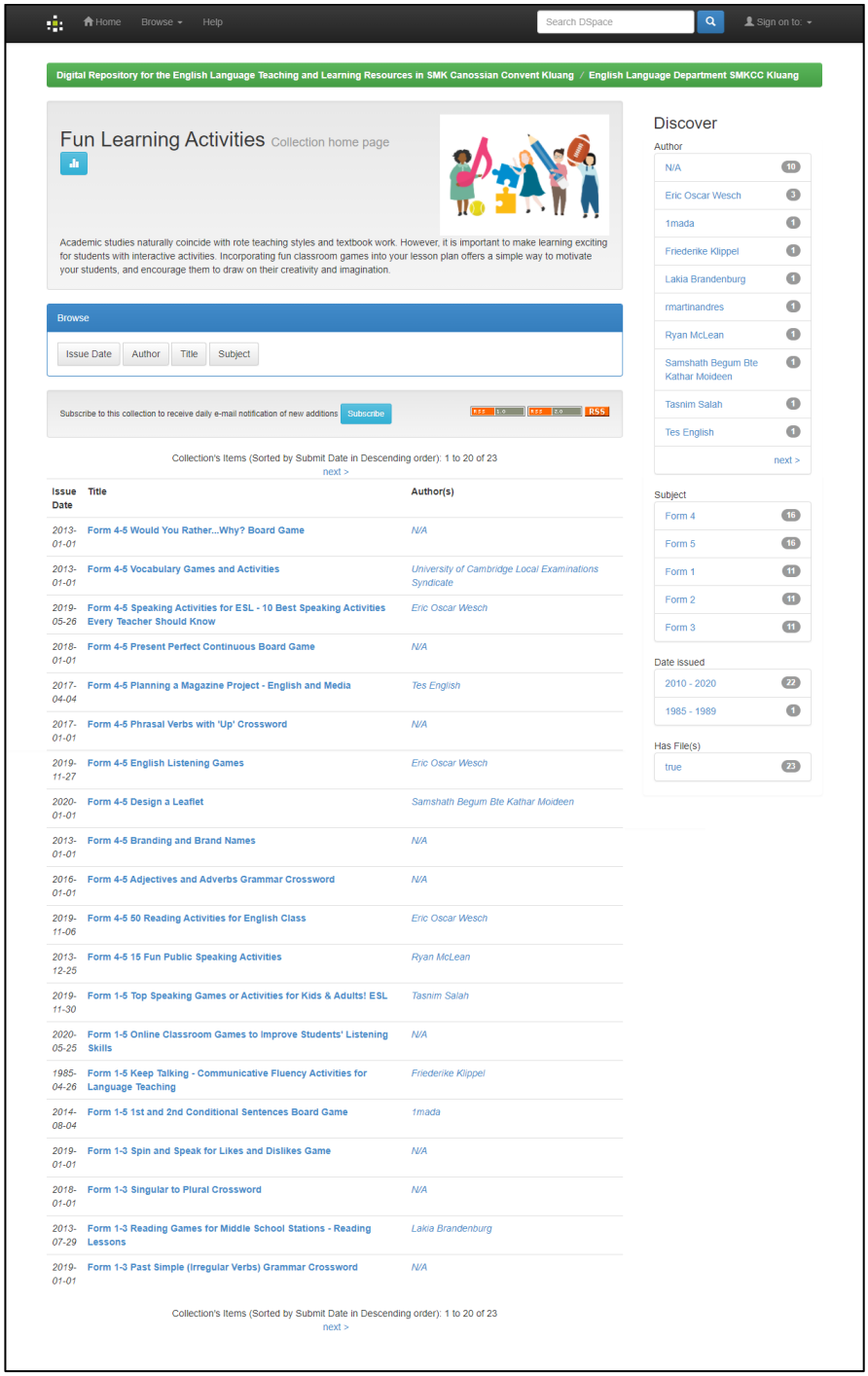

Figure 8: Example of a Collection Page

Items refer to the teaching and learning resources in the form of an image, text or video which belong to a collection. These images, texts and videos are in JPEG, PNG, DOC/DOCX,

PDF and MPEG formats. A total of 75 items were registered into this digital repository where each item consists of metadata, bitstream and licence. An example of an Item page is shown in Figure 9 below.

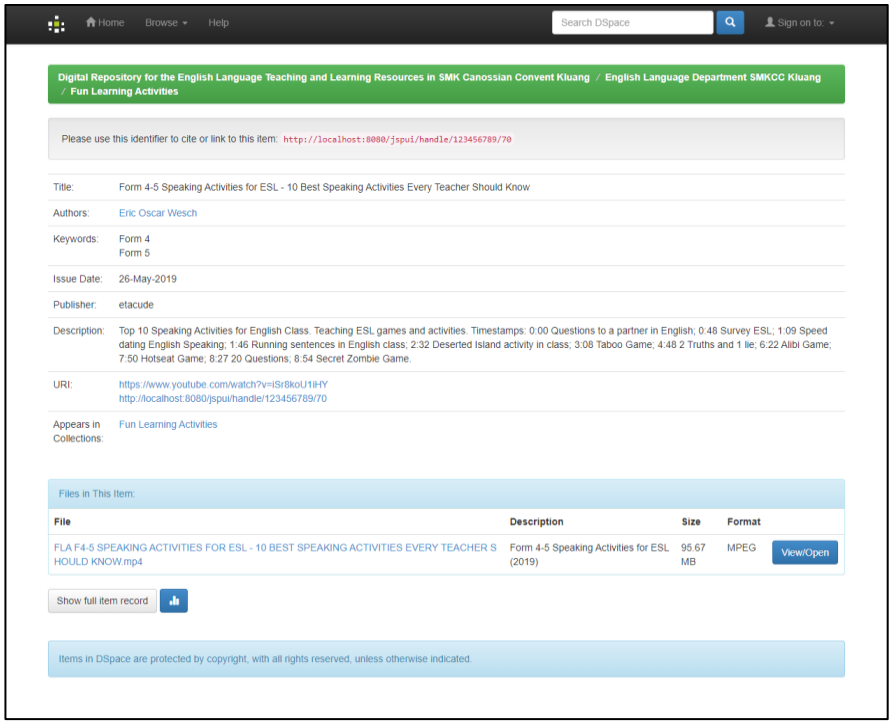

Figure 9: Example of an Item Page

The DSpace data model of the Digital Repository for the English Language Teaching and Learning Resources in SMK Canossian Convent Kluang is shown in Figure 10.

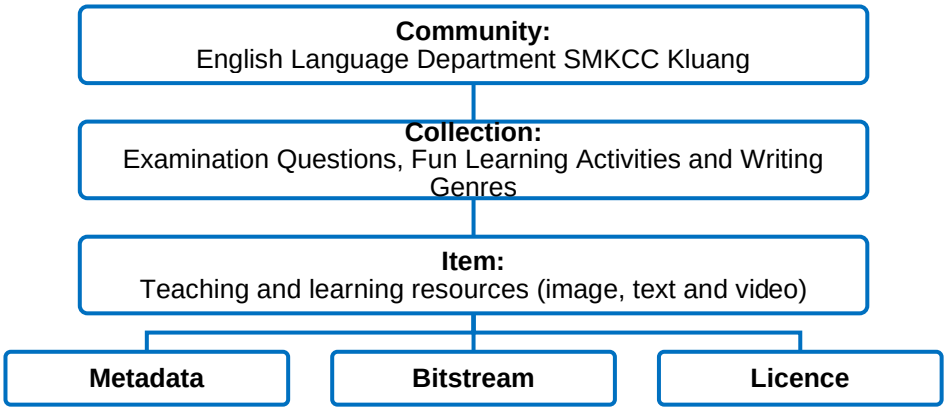

Figure 10: DSpace Data Model

DSpace allows users to access the teaching and learning resources via **Browse** or **Search**. Users can browse through the digital repository by Communities & Collections or browse items by Issue Date, Author, Title and Subject under 'Browse' at the top navigation bar as shown in Figure 11 below. Alternatively, users can also browse from the 'Discover' by

Author, Subject and Date issued on the digital repository homepage as shown in Figure 12.

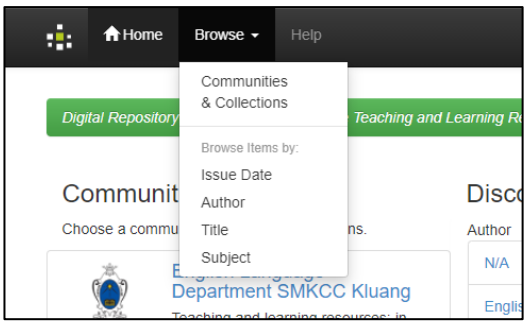

Figure 11: 'Browse' at the Top Navigation Bar

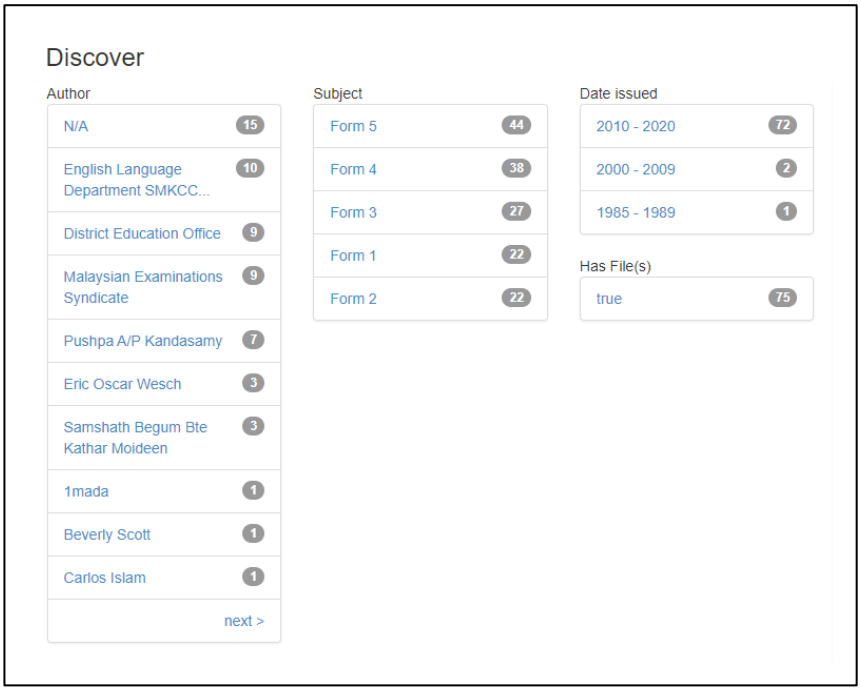

Figure 12: 'Discover' on the Digital Repository Homepage

Basic searching can be done by using the search box located on the top navigation bar to search all of DSpace as shown in Figure 13. For an advanced search, users can limit their search within a specific community by selecting the community in the search list and then using filters to refine the search results as shown in Figure 14.

Figure 13: Basic Search

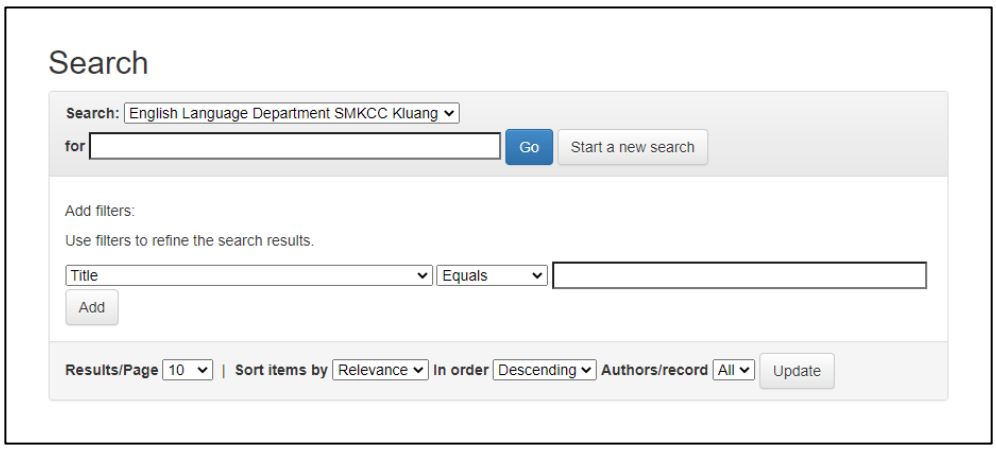

Figure 14: Advanced Search

DSpace uses the Jakarta Lucene search engine which supports **truncation** by using an asterisk (*) after a root word to obtain all hits of words with the same root word; **stemming** which automatically expands words with common endings to include plurals and past tenses; **phrase searching** by using quotation marks (" ….") before and after the phrase; **Boolean searching** to limit searches when finding items which contain all words or phrases combined with this operator (AND), enlarge searches when finding items which contain any of the words or phrases surrounding this operator (OR), and exclude items which contain the word following this operator (NOT); **exact word match** by putting a plus (+) sign before the word if it must appear in the search result; and **eliminate items with unwanted words** by putting a minus (-) sign before the word if it should not appear in the search result. The search engine also **ignores stop words** that do not add value to the search such as 'a', 'and', 'are', 'as', 'at', 'be', 'but', 'by', 'for', 'if', 'in', 'into', 'is', 'it', 'no', 'not', 'of', 'on', 'or', 'such', 'the', 'to' and 'was'.

The submission and approval of teaching and learning resources into the system was done by the researcher alone as this project is only a prototype. In future when this digital repository is managed by the school, users and groups setting in DSpace can be activated where only selected personnel can be authorised to handle the submission of items (accept or reject) and editing metadata of selected items. By successfully developing this digital repository prototype for the English Language teaching and learning resources in SMKCC Kluang, the second objective was achieved.

Evaluation of User's Level of Satisfaction

The third objective of this research project was to evaluate the level of satisfaction of the digital repository prototype among users. An evaluation was done using a survey questionnaire and the responses from the eight English Language teachers of SMKCC Kluang were analysed based on the Usefulness, Ease of Use, Ease of Learning and Satisfaction of this digital repository. Table 4 shows the analysis of responses in the survey questionnaire.

Table 4: Analysis of Responses

Aspect	Question	Number of respondents						
		SD	D	SWD	N	SWA	A	SA
Usefulness	1. It is useful	0	0	0	0	0	0	8 (100%)
	2. It makes the things I want to accomplish easier to get done	0	0	0	0	0	2 (25%)	6 (75%)
	3. It saves me time when I use it	0	0	0	0	0	3 (37.5%)	5 (62.5%)
Ease of Use	4. It is easy to use	0	0	0	0	0	1 (12.5%)	7 (87.5%)
	5. It is simple to use	0	0	0	0	1 (12.5%)	5 (62.5%)	2 (25%)
	6. It is user-friendly	0	0	0	0	0	6 (75%)	2 (25%)
	7. It requires the fewest steps possible to accomplish what I want to do with it	0	0	0	0	2 (25%)	6 (75%)	0
Ease of Learning	8. It is easy to learn to use it	0	0	0	0	0	2 (25%)	6 (75%)
Satisfaction	9. I am satisfied with it	0	0	0	0	0	1 (12.5%)	7 (87.5%)
	10. It works the way I want it to work	0	0	0	0	0	0	8 (100%)

Note: SD = Strongly Disagree; D = Disagree; SWD = Somewhat Disagree; N = Neutral; SWA = Somewhat Agree; A = Agree; SA = Strongly Agree

For the Usefulness aspect, all the respondents found the digital repository useful, helped them in searching for resources, and saved time. It was far better and quicker in retrieving items on the digital repository than the folder system in the computer and hard disk storages. The structured metadata helped users to retrieve the teaching and learning resources effectively. For the Ease of Use aspect, respondents agreed that this digital repository was easy and simple to use, user-friendly, and required only a few steps. However, this digital repository was still in the prototype stage and the user interface could be further improved with the DSpace customisation. The English Language teachers responded positively on the aspect of Ease of Learning because the DSpace JSPUI is a website-like view, giving the respondents a sense of familiarity. Keywords that included the level of collections and the existing search box helped the users in learning to use and navigate around the digital repository. Finally, as in the Satisfaction aspect, the responses from the teachers were very encouraging. All respondents agreed that they were highly

satisfied with the digital repository and that it worked the way they wanted it to do. The third objective was, therefore, achieved.

SIGNIFICANCE OF THE STUDY

From this research project, the images, texts and videos of the school's English Language teaching and learning resources could be retrieved easily. Access to these resources was improved as they were indexed using structured metadata where teachers could browse and search the collection of resources better than was done previously. This digital repository prototype made it easier to keep the information up-to-date as the contents could be updated anytime. Should the resources cease to exist or be deleted from their original website, these resources will still be preserved and stored securely in this digital repository. With this digital repository, teachers could easily access a wider range of resources stored at a single location and utilise them for effective and captivating online lessons for their students during this COVID-19 pandemic period.

LIMITATIONS AND RECOMMENDATIONS

There are a few limitations in this research project. Firstly, only three collections (Examination Questions, Fun Learning Activities and Writing Genres) were selected as content as this research project was only a prototype. In the long run, it would be good to include other collections of resources and also add new items into the digital repository. Secondly, due to the lack of skill and expertise in using DSpace, only a small part of customisation was carried out to enhance the user interface. This user interface can be improved further with additional DSpace customisation so that the collection of resources can be readily displayed on the homepage whenever users open the digital repository. Finally, the server used was a local host which could only be accessed on the personal computer of the researcher and was limited to a single person per usage at a time. This digital repository project can be further improved by having it published on the internet so that resources are easily accessible by the teachers anytime and anywhere.

CONCLUSION

This Digital Repository for the English Language Teaching and Learning Resources in SMKCC Kluang built using the DSpace system, pooled all the relevant resources together and systematically organised them for easy retrieval. In addition, the structured metadata in the digital repository prototype led to better information management of the teaching and learning resources. Results from the survey showed a satisfaction rate of 100% among the users. All the users also agreed that the digital repository was useful as it helped them solve the storage and retrieval issues that they had faced prior to its introduction. The research objectives were, therefore, achieved and hopefully, this digital repository will be further improved in future. In time we hope this project will be adopted by other subject departments in the school or by other institutions.

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Disaster Mitigation for Protecting Archive at the Library and Archives Office of Gunungkidul Regency, Yogyakarta

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ABSTRACT
This study aims to describe and analyze disaster mitigation in the protection of archives at the Library and Archives Office of Gunungkidul Regency. This research adopted a qualitative descriptive approach. The technique of determining informants is applied by using purposive sampling, where a selected six staff of the Library and Archives office that are regarded as the leading informants are chosen as respondents. The data collection in the study employed observation, interview, and documentation techniques while the data analysis used data reduction, data presentation, and conclusions. The results showed that the disaster mitigation carried out by the Library and Archives Office include socialization about saving archives, preventive action before a disaster planning in handling archives rescue from disasters, technical training for employees, and the establishment of an integrated information and communication system. In its implementation, there were several inhibiting factors, such as human resources and budget issues. Therefore, the solution given in maximizing disaster mitigation are the recruitment of human resources and budget proposal.

Keywords: Disaster mitigation; Archive protection; Library and Archive Office; Gunungkidul

INTRODUCTION

Indonesia is an archipelago country that has diversities and differences geographically, hydrologically, geologically, and demographically. In addition, Indonesia is located geographically between two continental plates that are dynamic. The continental plates can at any time experience shifting activity that can lead to movements resulting in several natural disaster events (Rachmawatie 2016). According to Mumtaz (2018), Yogyakarta Special Region is one of the areas that has received the title of a disaster window area. From the study results, there are 59 sub-districts out of a total of 78 sub-districts in Yogyakarta that are vulnerable to natural disasters. Natural disasters in Yogyakarta occur in several areas, such as in the north, where Mount Merapi is one of the most active mountains in the world and its eruptions periodically. Then in the south, the Yogyakarta coastline directly faces the vast sea, wherein the Indian Ocean there is an Australian fault. When there is a fault plate collision, there will be a tectonic earthquake. If the earthquake strength reaches 6 SR and above, it will become in the potential to cause a tsunami disaster. During the dry season, Yogyakarta has issued a drought status almost

every year. While, during the rainy season, these disasters that occur are floods and landslides. Meanwhile, Gunungkidul district is one of the districts of Yogyakarta Province. The location of Gunungkidul district is close to the coastal area and has a large forest area, which allows natural disasters such as fires, earthquakes, floods, or tsunamis at times.

Natural and non-natural disasters are events that cannot be predicted when they occur because the impact of a disaster is something that is very much avoided. The impacts caused by natural disasters are many and can be felt quickly. The impact of a disaster can not only be detrimental to one or two things but also many things that can be affected by the disaster. One of the most complex impacts of disasters is felt besides the impact of disasters on buildings and people, namely important public files. For example, according to Ihwan (2013) in 2004, there was an earthquake and tsunami in Aceh. Apart from the lives and property that were lost after the disaster, thousands of archives were also damaged and lost. Some of these archives are vital records, namely, archives whose existence is a basic requirement for the operational continuity of the archive creator, cannot be updated, and cannot be replaced if damaged. In the aftermath of the disaster, government institutions and individuals have lost a lot of vital archives which are very important and irreplaceable. This kind of thing can happen because people do not understand how important it is to protect and maintain archives so that they are protected from damage due to natural disasters that cannot be predicted when they occur.

Another example was stated by Srirahayu (2020) that in 2009 there was an earthquake in West Sumatra, especially the city of Padang with a scale of 7.9 SR. The loss from the impact of the earthquake was not only in the form of damage to buildings that were flattened to the ground but also most of the collections owned by the Library and Archives Agency. Of the total collections that were damaged by the disaster, only about 20% could be saved. The archival institution is an institution that keeps important files that can be used by the general public if needed. Early rescue of archives in the archiving institution is very important, if at any time an unpredictable disaster occurs in the archiving institution and there is no quick rescue action or early prevention then the stored files will be damaged. The Library and Archives Office of Gunungkidul Regency is the center of the Gunungkidul regional library archive database, which contains many important archives and documents regarding the Gunungkidul library and regional archives. As a form of prevention and management of natural disasters, it is necessary to have a disaster mitigation effort that must be prepared by the Gunungkidul Regency Library and Archives Office to save important archives and documents from the dangers of natural disasters that can occur at any time. From this background, the authors are interested in researching "Disaster Mitigation Efforts in the Protection of Archives at the Library and Archives Office of Gunungkidul Regency".

LITERATURE REVIEW

Disasters are a consequence of a combination of natural activity (a physical event, such as a volcanic eruption, earthquake, and landslide) and human activities (Sukirno 2011). Law Number 24 (2007) concerning Disaster Management states that a disaster is an event or series of events that threatens and disrupts people's lives and livelihoods caused, either by natural factors and/or non-natural factors as well as human factors, environmental

damage, property loss. Besides, a disaster is an event that has unpredictable timing, is very destructive, and lacks planning.

According IFLA (1999), principal causes of disasters are causes by natural disaster and man-made disasters. Natural disasters include rain and windstorms, floods, biological agents (micro-organisms, insect or vermin infestation), earthquakes, and volcanic eruotions. Meanwhile, man-made disasters cover acts of war and terrorism, fires, water (broken pipes, leaking roofs, blocked drains, fire extinguishing), explosions, liquid chemmical spills, building deficiencies (structure, design, environment, maintenance), and power failures.

In-Law Number 24 (2007) concerning disaster management, disaster management is a series of efforts that include the establishment of development policies at risk of disasters, disaster prevention, and emergency response and rehabilitation activities. Disaster management is carried out as an effort to eliminate and/or reduce the threat of disaster. According to Mileti Gottschlich (2001) in Muzani (2020) disaster management has four stages including prevention/mitigation, preparation, response, and recovery:

a. Prevention / mitigation.
   A series of efforts to prevent and reduce disaster risk through physical development and awareness-raising and capacity building to deal with disasters.
b. Preparation.
   A series of activities and steps that are appropriate and efficient. For example, the preparation of communication facilities, posts, evacuation sites, contingency plans, and disaster management guidelines.
c. Responsive.
   A series of activities carried out immediately in the event of a disaster to deal with adverse impacts, including rescue and evacuation of victims, property, and fulfillment of basic needs.
d. Recovery.
   A series of emergency recovery processes related to the condition of the disaster that occurred, such as restoring facilities and infrastructure to their normal function.

According to Sukirno (2011), mitigation is a term used to denote all actions to reduce the impact of a disaster that can be carried out before the disaster occurs, including preparedness and long-term risk reduction measures. Meanwhile, Rachmawatie (2016) states that disaster mitigation is a form of effort to reduce the risk of disaster hazards carried out by a certain agency using physical development, increasing awareness of the importance of disaster hazards, and the ability to face disasters. Disaster mitigation can also be interpreted as a disaster management step aimed at reducing or eliminating the victims and losses that arise when a disaster occurs.

In its implementation, disaster mitigation is divided into two types, namely structural and non-structural disaster mitigation (Rachmawatie 2016), namely as follows:

a. Structural mitigation
   It is mitigation efforts by minimizing disasters by building various physical facilities that combine technology. In principle, structural mitigation is an effort to reduce vulnerability to disasters by innovating or engineering the planned building. An

example of structural mitigation is the manufacture of earthquake-resistant buildings.

b. Non-structural mitigation
   It is an effort to reduce disaster risk by formulating policies to avoid more damaging risks. Examples of non-structural mitigation include making policies or laws, creating safe urban spatial planning, conducting disaster education, and conducting disaster training.

The archive comes from Greek, which is from the word arche which then changes to archea and then changes back to archeon (Sugiarto and Wiyono 2015). According to Law Number 43 (2009) concerning Archives, archives are records of activities or events in various forms and media following developments in information and communication technology that are created and accepted by state institutions, local governments, educational institutions, companies, political organizations, organizations, community and individuals in the implementation of social, national and state life.

According to Hendrawan (2017), types of archives based on their function are divided into two types including dynamic archives and static archives. As for the maintenance of archives, there are preservation activities which include:

a. Archive must be stored in a fire-resistant room equipped with a fire extinguisher
b. The temperature and humidity are kept as stable as possible, the relative humidity is 40% - 50%.
c. File storage rooms that must be locked and access to room keys are closely monitored
d. The file room must be equipped with a heat and smoke detection system.
e. The file room must be equipped with a security alarm system.
f. The glass windows in the filing room were covered with an ultraviolet light filter and curtains. Maher (1992) in Hendrawan (2017).

According to the Regulation of the Head of ANRI Number 23 (2015) concerning Protection and Rescue of Archives from Disasters,

> "The implementation of activities to protect and save archives from disasters is a reference for archive creators, archival institutions and related technical institutions in carrying out protection and rescue actions for archives from disasters"

Furthermore, Regulation of the Head of ANRI Number 23 of 2015 in (Suliyati 2017) explains that disaster management has three stages including during pre-disaster, during emergency response, and post-disaster. Disaster management activities against archives during pre-disaster in the form of:

a. Archival institutions at the central and regional levels need to carry out maximum and comprehensive socialization of laws and government regulations regarding the management, maintenance, protection, and preservation of archives.
b. Take anticipation or preventive action before a disaster occurs, namely knowing and understanding the location or location of the institution, whether it is located in an area prone to floods, prone to landslides, close to volcanoes, and similar disasters.

c. There needs to be planning in handling and saving archives from disasters, starting from disaster anticipation, coordination, handling, and rescue of archives from disasters.
d. Forming a team for handling and saving archives from disasters.
e. Forming a team for handling and saving archives from disasters.
f. Establishing an integrated information system, namely communication between agency leaders, staff in agencies, security forces, and related parties such as the local Disaster Management Agency.
g. Cooperating with other agencies located far from the disaster site, which can be used as a temporary storage place to secure files from disasters.

The emergency response stage is that the archive manager must carry out a theoretical analysis of the causes and consequences of the disaster and begin planning actions to protect and save archives in a short time. In addition, coordinating with other agencies such as the National Disaster Management Agency (BNPB) or the Regional Disaster Management Agency (BPBD) and archival institutions to reduce the risk of physical damage to archives and information contained therein, provide support in handling damaged archives, and rescue and evacuation of archives.

As for the handling of archives at the post-disaster stage, namely efforts to carry out rehabilitation and reconstruction, which includes restoring the function of archival infrastructure, rehabilitating archival infrastructure, reconstructing archiving infrastructure, increasing the capacity of the archiving system, improving the working environment, arranging the space for managing archives, increasing community participation in maintenance and protection of archives, and increasing collaboration with other related agencies. Of the several stages of disaster management in efforts to protect archives, disaster mitigation is a step to save archives at the pre-disaster stage. Because disaster mitigation is a series of efforts to reduce disaster risk that need to be done in an archival institution.

One of the greatest problems in terms of disaster preparedness plan is that it may never have to be implemented. Therefore, staff enthusiasm, financial support, and continual re-assessment of dangers must be maintained well and carefully in order to put into action. Such plan needs to be able to convince all those concerned of its vital role in the continued existence of the institution. This means not only the professional staff of the library or archive, but also all the support staff, such as cleaners, porters, doorkeepers, etc. and the senior management of the parent institution and funding body. A plan can only have a chance of being effective if all these groups believe and continue to believe in its importance (IFLA 2006).

RESEARCH DESIGN

This research is qualitative. Sources of data used consist of primary and secondary. The primary data sources are in the form of informants, while the secondary data sources in the form of books, journals, the internet, and photos. The data collection techniques of the research employed observation, interview, and documentation. Meanwhile, the data analysis technique used is Miles and Huberman's model consisting of data reduction, data presentation, and conclusion drawing. And the data validity test conducted in this study

is the triangulation of sources, triangulation of techniques, and conducting member checks. The informant profiles in this study are as follows (Denzin and Lincoln 1994, Laugu 2015):

Table 1: Demographic information of informants

No	Name	Position	Education	Gender	Work experience
1	HK	Head of Archives	Bachelor of Public Health	M	4 years
2	AU	Head of Section of Static Archives	Bachelor of State Adm	M	3 years
3	SR	Head of Section of Dynamic Archives	Bachelor of Economics	M	15 years
4	NR	Supervisor Archivist	Diploma 3 of Archives	F	10 years
5	YP	Supervisor Archivist	Diploma 3 of Archives	M	11 years
6	TH	Young Archivist	Diploma 3 of Archives & Bachelor of Library Science	M	9 years

Source: Data processing by researchers, 2021

RESULTS AND DISCUSSION

Disaster Mitigation in Archive Protection

(a) Maintenance of archives

Archive maintenance activities are also known as archive preservation activities. Archive preservation consists of preventive preservation activities, namely preventive measures and curative preservation, namely archive repair activities when damage has occurred. However, the Gunungkidul Archives Depot has only carried out preventive maintenance activities or preventive measures so far.

Active archive storage

Active dynamic archives are stored in the archive folder and then placed in a filing cabinet, which is a special storage area for archives made of fire-resistant iron and is not susceptible to biological disasters such as termite pests. The location of active dynamic archive storage is in the south room of the Head of Archives, in a room with air conditioning facilities, as well as a clean and tidy room condition. The active dynamic archive does not require a lot of maintenance because the intensity of using active dynamic archives is still high.

Inactive archive storage

Types of archives stored in inactive spaces include textual archives and cartographic archives. Inactive archives are important records that must be maintained for the value of the archives, therefore inactive archive storage is provided with facilities such as 24 hours non-stop air conditioning as well as the state of the archive storage space which must always be maintained in quality storage space. Storage of inactive textual files is stored in an archive box and placed on a fireproof steel shelf accompanied by a list of files. Meanwhile, for cartographic archives, it is stored in a large enough filling cabinet or can be called a map cabinet.

Static archive storage

Static archives owned by the Archive Depo include textual and non-textual archives. Textual archives are in the form of letters or files in general, while non-textual archives such as cassette archives and film archives. Static archives have a special storage space, namely static space. Static archive storage is stored in an archive box and then placed on a special shelf called Roll O Pack, the shelf is made of refractory iron with wheels as a tool to make it easier to use. Roll O Pack is a closed archive storage rack, unlike the rack used on inactive filing racks, which is without having to open and close the shelf to access the archives. In addition to the Roll O Pack, in the static archive room, there is also a wooden shelf that is used to store cassette files.

(b) Maintenance tools

Air Conditioner

Every room in the Archive Depot is equipped with adequate air conditioning facilities. For archive storage space, such as inactive dynamic archive space and static space, AC usage is provided for 24 hours nonstop. This is because the storage space is maintained at an ideal temperature. Sudrasono (1989) in Muliyadi (2013) also states that the ideal conditions for storing library and archive materials are air temperatures that are fixed at 16 ° C and 21 ° C. set at 22 ° C.

Light Fire Extinguisher

The light fire extinguisher is a fire prevention tool owned by the Archive Depo. For now, the Archive Depot only has one fire prevention tool which is sufficient. Gunungkidul Archive Depo does not have fire mitigation facilities such as fire detectors or smoke detectors, hydrants, and other equipment for fire disaster prevention.

Thermohygrometer

In Perka ANRI (ANRI 2015) temperature and humidity regulation is carried out based on the type of archive stored with technical implementation which includes periodic checks. Measurement of temperature and humidity using a thermohygrometer, which is a combination of a room thermometer and a hygrometer (hygrometer) to regulate room temperature and humidity. There are two thermohygrometers owned by the Archive Depot, namely in the inactive room, and one unit each of the static space is provided.

Dehumidifier

The dehumidifier is a tool to control the humidity in a room. One of the supporting equipment in archival storage in the storage room is a dehumidifier. Based on Perka ANRI (ANRI 2015) temperature and humidity regulation using a humidifier which functions as an absorber of moisture from the air with a set of not more than 27 ° C and humidity of

not more than 60%. The Archive Depot has two medium-sized units of the dehumidifier and is placed in an inactive room. The air humidity regulation is checked regularly by the archivist so that the room remains in a stable room humidity condition, which is set at a humidity value of 52%.

Exhaust Fan

There are 6 exhaust fans owned by the Archive Depo, which are placed in the inactive room. This tool serves to suck or take air in the archive storage space to be dumped outside, and at the same time draw fresh air outside into the archive storage room. In addition, the exhaust fan can also adjust the volume of air to be circulated in the archive storage space.

Silica Gel

Silica gel is additional equipment owned by the Archive Depot in the archive storage space. Typically, the Archive Depot uses camphor as a means of controlling room humidity and also as a prevention of pests and fungi on archival paper. However, for now, the Archive Depo prefers silica gel as an additional humidity control device, besides being facilitated by the existing thermohygrometer and dehumidifier. Silica gel is placed on every active, inactive archive shelf, or a static archive shelf, precisely at every corner of the archive box.

Pest Poison

Pest poisons are used to avoid damage to archives and file boxes made of paper from rats around the Depo Archives building. Storage equipment and the condition of the archive storage space which is always closed and supported by adequate maintenance and archive maintenance facilities have ensured that rats will not easily enter the archive storage space. However, this is done as a precautionary measure by providing additional means so that archive maintenance efforts can run well.

Fumigation

So far, the Archive Depo has carried out fumigation twice. The last fumigation was carried out in 2019, the fumigation process has gone through the requirements and is guided by ANRI regulations. The fumigation carried out by the Archive Depo lasts for three days because the process uses poisonous gas which requires that all the environment around the Archive Depo is not allowed to carry out work activities. Two days are used for the fumigation process and one day is used for the sterilization period of all activities after the implementation of fumigation.

(c) Disaster mitigation

From several disaster management activities for archives, especially during pre-disaster times based on the ANRI Rule, here are some mitigation efforts for the Gunungkidul Regency Library and Archives Office, including:

Conducting thorough socialization about saving archives

The Archive Division has participated in and carried out several Technical Guidance activities as well as mentoring activities for the community. These assistance activities are such as the socialization organized by the Library and Archives Office of Gunungkidul Regency, especially the Archive Sector, which is a routine activity carried out to provide

socialization related to how to manage, maintain, protect and save archives in the community. Broadly speaking, the socialization activities for the community are given only limited direction on how to properly manage archives in the form of directions for managing and maintaining records in an institution or society and how to save archives if at any time a disaster occurs. However, there has never been any activity specifically focused on disseminating information on how to save archives from disasters.

Take anticipation or preventive action before a disaster occurs

Forms of anticipation or preventive action are taken include understanding the location of the archive storage building or Archive Depot that is far from disaster-prone areas. The location of the archive storage building or the Archive Depot is in the middle of Wonosari city, precisely to the east of the Gunungkidul Regional Government building. Gunungkidul Regency is an area that has experienced several earthquakes, but so far the Archive Depot has never experienced heavy damage to the Archive Depot building.

Planning in handling archive rescue from disasters

It was explained that archivists must ensure that they have a disaster plan that includes, among other things, policies, procedures, and information that lead to appropriate actions to restore and reduce the impact of disaster risks that occur unexpectedly both natural and man-made disasters. In efforts to mitigate disasters in archival protection, it is necessary to have a good and structured plan as a form of anticipation from the Gunungkidul Regency Library and Archives Office so that archives can be saved if at any time a disaster threatens the safety of the archives and employees in the Archive Depot. The planning efforts that have been carried out include the provision of evacuation routes and standard archival rescue procedures. The provision of evacuation routes is very important, not only in buildings or other offices that are prone to disasters but also in all buildings that require good security related to work safety (Tansey 2015).

Conduct technical training for employees and staff

So far, the Library and Archives Office of Gunungkidul Regency has provided training to staff and archives in the form of socialization as well as training related to fire disaster management which was held in 2019. This activity was held by the Gunungkidul Regency Library and Archives Office by collaborating with the UPT Pemadam. The fire whose building is just to the east of the Depo Archives building. Of course, this facilitates the process of implementing the socialization and training held by the Gunungkidul Regency Library and Archives Office because the building is located next to each other.

Establish an integrated information and communication system

Based on the experience that has been carried out, the Department of Library and Archives Department of Gunungkidul Regency has collaborated, which is related to fire disaster management training activities carried out with the UPT Fire Department, namely during the implementation of socialization and training for fire disaster management.

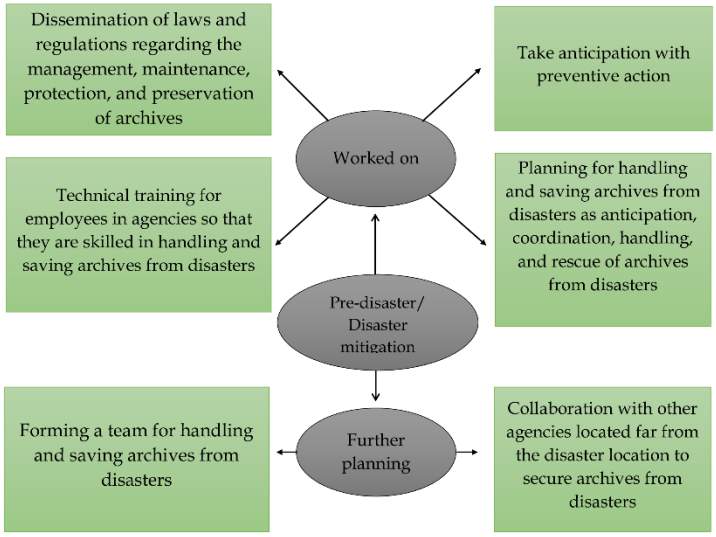

Figure 1: Disaster mitigation at the Library and Archives Office of Gunungkidul Regency
Source: Data processing by researchers, 2021

Inhibiting Factor

(a) Human Resources

According to Hendrawan (2017), the influence of archival human resources in archiving activities as a whole is very important, because what is the meaning of an institutional system or facilities and infrastructure if it is not supported by capable and reliable human resources. The Department of Library and Archives of Gunungkidul Regency, especially the Archives Division, has three archivists in terms of human resources. Among them are two supervising archivists and one young archivist. However, the human resources in the Archival Sector are still lacking because there are only three archivists. To carry out activities such as disaster management or when there is an institution that requires assistance to rescue archives from the Library and Archives Office, all staff and employees must be deployed to the field because if only three people are handled, these activities cannot be completed optimally. This human resource problem has indeed become one of the inhibiting factors that are felt by some employees of the Archival Sector.

The Archive sector does not have a special team in disaster mitigation activities in archive protection, therefore all employees and staff are involved in disaster rescue activities as was done in 2017 when a flood disaster was felt by one of the schools in Gunungkidul, namely SMK Tanjungsari. In the activity of saving the archives due to the flood disaster, all employees and staff together with archivists came together to save the archives.

(b) Budget

The budget is very important and very influential on the implementation of activity including disaster mitigation activities. In addition, the budget is also a measure of the success or failure of the implementation of activities to be carried out by an institution or organization. Therefore, it is important for the Library and Archives Office of Gunungkidul Regency, especially in the Archive Sector, to have a special budget that is given for disaster

mitigation activities in the Archiving Sector itself. But in reality, the budget for disaster mitigation activities is one of the things that is still ignored by its importance. The Gunungkidul Regency Government has realized the importance of archives, but there has been no feedback or provision of a significant budget in the continuity of disaster mitigation activities in the Gunungkidul Regency Library and Archives Office, especially the Archive Sector.

Solutions

Of the several inhibiting factors that have been mentioned and explained, it is necessary to have a solution of several things that hinder disaster mitigation efforts in protecting archives at the Gunungkidul Regency Library and Archives Office. From the results of the interviews that have been conducted, there are several solutions proposed by the Gunungkidul Regency Library and Archives Office. However, from several solutions, as follows:

(a) Recruitment of human resources

The addition of human resources or personnel needed by the Library and Archives Office of Gunungkidul Regency, especially the Archive Sector, is being pursued and is still in the process of recruiting registered personnel. The Archiving Sector has now opened a selection formation for freelance workers who are preferably graduates from the archiving field. Additional personnel in the Archive Sector are continuously sought every year, this is because every employee who registers at the Archive Depot usually does not last long to stay as a freelance daily worker. From the experience of each year, the majority of this personnel also follow the selection formation for civil servant candidates opened by the government, so if these workers pass, the personnel in the Archiving Sector will be reduced.

(b) Budget Proposal

Budget proposal is one of the efforts of the Gunungkidul Library and Archives Office, especially the Archives Sector as a support for disaster mitigation in the Archive Sector. Because there is no special budget for disaster mitigation activities in the framework of archival protection, the budget proposal process is not easy. The budget proposal must go through a fairly long process to obtain them. As it is known that the Gunungkidul Regency Library and Archives Office is an institution under the auspices of the Gunungkidul Regency government, so to obtain a budget it is necessary to have a good and structured budget planning from the Archive Sector then submitted to the Head of Office and then submitted to the Gunungkidul Regional financial institution.

Every year, the institution must submit a budget related to activities to be carried out at an institution. This is because every activity requires facilities and infrastructure as well as supporting the achievement of existing activities in the institution, including archival institutions. However, for now, because obtaining an indirect budget can indeed be accepted, of course, must go through the processes and procedures that have been directed by the leadership.

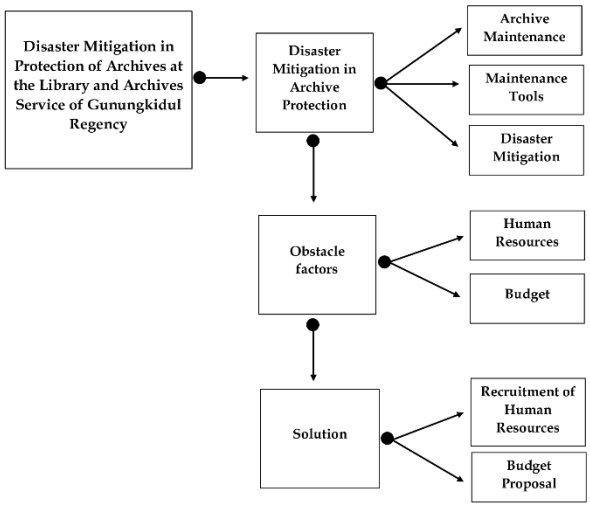

Figure 2: Illustration of the relationship amongst disaster mitigation in archival protection, inhibiting factors, and solutions
Source: Data processing by researchers, 2021

CONCLUSION

The conclusions of this study are as follows: (1) disaster mitigation efforts carried out by the Library and Archives Office of Gunungkidul Regency include socialization about saving archives, anticipating or taking preventive action before a disaster occurs, planning in handling archives rescue from disasters, conducting training technical personnel, forming an integrated information and communication system. However, several things have not been implemented, namely forming a team to rescue archives from disasters and collaborating with other agencies that are located far from disasters; (2) The implementation of disaster mitigation efforts has several obstacles, namely due to the human resource factor in the Archivist Field which only has three archivists and the budget factor which is important in implementing disaster mitigation efforts in archival protection; (3) So far, the solution to the obstacles made by the Library and Archives Office of Gunungkidul Regency includes the addition of human resources in the Archiving Sector and the efforts to submit a budget that is carried out annually by the Archiving Sector.

Based on the results of the research, the researchers gave suggestions to the Gunungkidul Regency Library and Archives Office to maximize disaster mitigation in archival protection so that the implementation process of archive management and storage can run well and optimally. That too is inseparable from all the good performance by human resources in the field of archives so that it is necessary to select good and competent personnel in the field of archiving, as well as other support such as budgets that need to be considered again so that the archive management process can be carried out optimally, including requiring good facilities and infrastructure certainly require a good budget for the archiving sector.

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Lessons Learned for Libraries during the Pandemic: A Review

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ABSTRACT
The Corona virus has affected a myriad of professions and scientific institutions around the world, and the library and information centers have also suffered from adverse consequences of the pandemic. The way libraries have confronted and experienced the new transformations during the pandemic are of great importance and should be explored. Due to the unpredictable timeline of the pandemic, libraries and information centers have to adapt to changes and should be properly prepared for the post pandemic era. Lessons learned from the pandemic can be effectively utilized as and when the reopening of libraries and future planning services. Defining a practical unified model for the reopening as well as having resilience according to library values and policies is absolutely vital. To achieve this goal, Apollo project model was introduced and developed for libraries in the post pandemic period. Library values should also be deemed as an essential factor for raising the awareness to people about libraries in the society during this pandemic period. It is suggested that library leaders, librarians including library equipment and services, are to be adapted to the current pandemic and post pandemic transformations and conditions. Libraries and information centers will be competently better at serving their communities, implementing their instructions and be more efficient in playing their role during post pandemic.

Keywords: Library reopening, Post pandemic, Library services, Library values, Apollo project model

INTRODUCTION

Corona virus known as “COVID-19” appeared in the city of Wuhan, China, and has spread rapidly to all countries across the world.

The fast spread of this virus has called the attention of the world to quickly take all the necessary steps and measures to fight and control the virus. Presently, the global community is ravaged by the pandemic while the end to the COVID-19 remains unknown due to variations of its spread among the countries (Ladan, 2020). The COVID-19 pandemic has become a long-term reality, disrupting all aspects of life for everyone on our planet and impacting nearly every profession, including libraries (Jones, 2020).

Critical roles of libraries are undeniable in society in multiple sectors; Not only do libraries offer information and resources on many ways, but also serve as community centers and welcoming environments on campuses and in various communities. Meanwhile, with the pandemic, many libraries have had to close their doors to in-person gatherings and services and transformed to an online environment, often within hours, so Librarians have had to make decisions and change very quickly and continually during the current

environment and library management has to decide what should be done in health crisis either for the society or for the library survival (Connaway, 2020).

Since, the potential roles of the libraries and their associates to acquire, evaluate, package, store and disseminate information, have placed a huge demand to intervene in critical situation such as pandemic era (Yap ,2020), therefore, Libraries and librarians still need to pursue their potential services in a global landscape, despite the emergence of unavoidable disturbances caused by COVID-19.

Ali & Gatiti (2020) revealed that there will be a significant role for librarians and information specialists during a pandemic situation in a country. They listed the expected role of a librarian; firstly, to promote public health awareness by creating and disseminating information relating to preventive measures; secondly to support research teams, researchers and faculty by providing information regarding the latest developments, research and literature; and finally to meet the core needs of regular library users.

As the prominent roles of librarians around the world are quite distinctive, hence it is better to review and take a quick look at some libraries efforts and experiences during pandemic in different countries.

LITERATURE REVIEW

Idhalama (2020), investigated the perceptions and attitudes of library and information professionals toward COVID-19 and the compulsory lockdown in Nigeria. An online survey was developed to get responses from 97 Nigerian library and information professionals. Findings of the research indicated that the majority of library and information professionals in Nigeria preferred partial lockdown to full lockdown, while other respondents felt that the current lockdown has brought economic recession and acute hunger in the land and for sustaining the prestige of the profession, government should tackle and fight the pandemic to the standstill.

Landoy, (2020) investigated how the University of Bergen Library in Norway, handled the challenges following the COVID-19 pandemic when the University of Bergen closed the campus on short notice and the Library immediately had to go fully digital by helping students by more automated access to electronic books and services. The results were the expansion of e-mail and chat-functions with librarians working from home with less-than-ideal infrastructure.

The suspension of in-person services and loss of access to physical collections at the University of Toronto's network of academic libraries left more than 100,000 students, staff, and faculty with only remote library support available for their research. Leveraging and expanding existing online services and digital collections and acquiring or building new research tools for scholars to deploy, were approaches the University of Toronto Libraries' staff have taken since the COVID-19 pandemic changed library operations (Walsh, 2020).

Roe (2020), described the experience and actions of the Laurentian University Library and Archives in the context of the COVID-19 pandemic over the spring and summer of 2020. The pandemic and the campus shutdown were experienced as disorienting and stressful for library employees, although work continued as well as possible. Over the course of the summer, a kerbside pickup and scanning service launched, a HathiTrust membership was sought, on-site archival work was restarted and plans were prepared for opening library space for study.

Bakti (2020), analyzed the use of social networking services in post-COVID-19 libraries based on Zoom webinar in Indonasia. The results of the analysis revealed that most participants declared the importance of changing the role of libraries and librarians post COVID-19. In addition, they also indicated the importance of innovation in creating new products by librarians to meet the needs of post-COVID-19 users.

Chewe (2020), investigated the potential social media role in academic libraries in Zambia in pandemic times. The study found that while the use of social media for personal purposes was very high, the application of these platforms to facilitate service delivery was nonexistent. Challenges such as lack of social media literacy skills and poor technological infrastructure were critical success factors that needed to be addressed. For adopting social media tools for effective library services, it was recommended that Library managements needed to provide support to mobilize librarians into a more proactive and participatory role in creating social media presence. Moreover, Enhancing and upgrading social media literacy skills of academic librarians were of a great importance and finally designing a social media strategy to guide a smooth adoption and use of social media was proposed.

Yap (2020), studied the role of libraries in Kazakhstan during the pandemic and how they responded quickly to avoid disruption of programs and services.

Library of congress has postponed and cancelled all public events, including concerts and music-related programs, beginning in mid-March 2020 to reduce the risk of transmitting corona virus. Recently The Library's Concerts staff embraced a new challenge, expanding virtual efforts to share extraordinary musical experiences with audiences worldwide through a project called The Boccaccio Project which consisted of ten pairs of composers and performers to write and perform brief solo works in response to their experiences during the global pandemic (Moats, 2020).

Franca (2021) conducted a research on how COVID-19 pandemic has had an unprecedented impact on Edge Hill University libraries in the Uk and how due to restrictions in place and limited access, they could overcome the physical library space by increasing in investment in digital content to better support students in the current climate. Their experience involved the digital provision of University text books via their library website and development of broader library remote access for all students.

Harris (2021), examined the impact of the novel corona virus on Jamaican academic libraries during the first six months of the pandemic. The results of this study showed that the library pandemic preparedness and management had the biggest impact on staffing and service mobility. The study also proposed a continuity planning checklist focused on the strengths, various lessons learned, and the future reopening.

Othman (2021), measured the efficacy of synchronous web-based learning during ongoing pandemic, among postgraduate Library and Information Science (LIS) students of Bangladesh. The results revealed that limitation of internet data, unstable internet, along with power blackouts were some of the primary inhibitors blocking the participants to attend classes online. This study concluded that most students do not seem to be ready yet to study in a synchronous delivery mode. It also recommended educational institutions in Bangladesh to provide an alternative delivery method, in order to sustain academic excellence in these challenging times.

As library experiences are widely different according to their needs and conditions, it is absolutely necessary to organize a defined policy and model for reopening in post pandemic.

LIBRARY REOPENING MODEL

Boardly (2020), described how the space-age technology Project Apollo method could be applied to pandemic issues such as re-opening schools in the U.S. Apollo engineering used six key steps of systems engineering to facilitate the management of such a task which include:

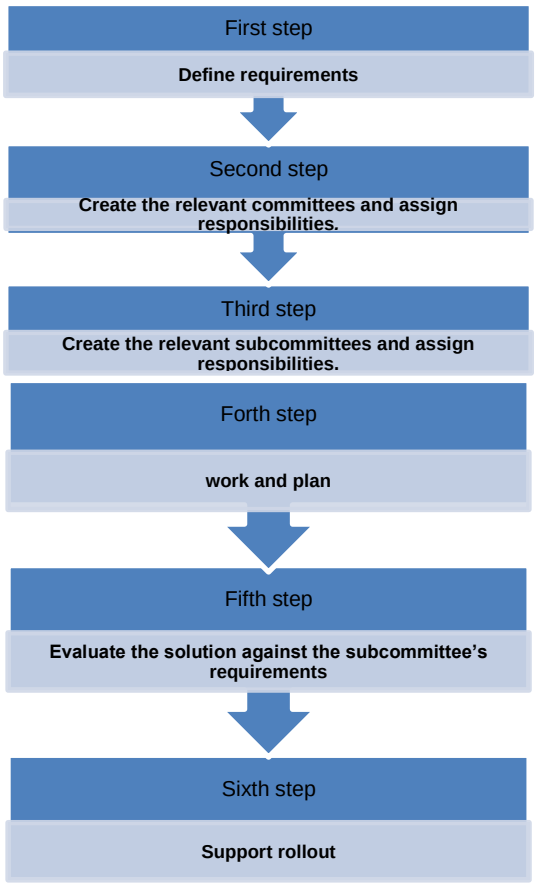

Figure1: Apollo project model for library reopening

These key elements of systems engineering can also be implemented for reopening of the libraries around the world after pandemic.

Define requirements:
The first step in planning to return patrons to libraries or information centers is by identifying stakeholders – including students, instructors, researchers and librarians– to hear their concerns. Then, planners must itemize the key benefits that libraries can provide in addition to training and services.

Create the relevant committees and assign responsibilities:
Coordinating a wide range of instructions is critical to safely reopening libraries. To do so, a small task force outlines an overarching approach breaking down the overall effort into its component parts, such as libraries ventilation and sanitation, development and services. The task force then creates a committee for each 'sub-problems,' such as an on-site librarian committee, testing and tracing, a remote service committee and a medical committee. To ensure that each individual group contributes to a successful overall solution, the task force develops committee requirements to guide and evaluate their efforts, while giving each committee as much flexibility as possible in leveraging its expertise.

Create the relevant subcommittees and assign responsibilities:
Each library committee outlines its approach to its sub-problem and creates subcommittees to provide more detail on different elements of the approach. For example, the on-site library committee might break off into smaller groups that address safety enforcement, design and building ventilation. Each subcommittee is given 'subcommittee requirements' to guide its efforts. If necessary, work can be further specialized within sub-committees as the space shuttle program involves more than a dozen levels of responsibility.

Work and plan:
As each subcommittee tackles its assignment, coordinators orchestrate their efforts to avert missteps and enhance synergies between other groups. For example, if the safety subcommittee concludes that some members will not keep masks on in library, the coordinator might create more aggressive requirements for those working on library design and ventilation.

Evaluate the solution against the subcommittee's requirements:
Integrate proposals from every committee. Once all issues facing on-site committee have been addressed, individual solutions – on masks, building ventilation, design, and more – are evaluated as a whole before being approved as the committee's integrated, overall solution. The committee solution is then evaluated against the committee's requirements. Each of the committee solutions is then evaluated as a whole before becoming the task force's plan. The task force's plan is then evaluated against its requirements. Stakeholder representatives then evaluate whether the plan ensures that libraries can, indeed, open safely.

Support rollout:

Initially, these protocols are implemented at a small scale and then ramped up slowly as all are trained to understand their responsibilities: librarians, administrators and other staff. Maintenance and adaptation is needed to deal with unforeseen events such as running out of masks or patrons and library staffs getting sick. Once an effective vaccine is available and the pandemic dissipates, the plan can detail how some protocols can be safely dismantled.

As Libraries worldwide are exploiting different resources, experiences and policies for better contact with their users, library values should not be neglected in a post pandemic world.

For this reasons, five key values of libraries are elaborated (IFLA policy and advocacy blog, 2020):

Information matters:
The importance of the access to information that libraries provide is only as great as the importance of the information itself, in the eyes of a decision maker. Pandemic is a good time to ensure a focus on creating strong and sustainable information infrastructures, not least in the shape of libraries, in order to ensure the preservation, organization and availability of information into the future.

Connectivity matters:
Libraries' mission to provide access to information for training and support in the pandemic times has made strong case for a serious investment in moving towards universal connectivity.

Universality matters:
The pandemic has had far reaching different consequences for almost everyone, especially those in precarious jobs often suffered far more than others. Libraries are a great example of this, with a clear mission to provide universal services. Libraries themselves always need to be aware of how their work may be more or less accessible or welcoming to different individuals and groups.

Culture matters:
Culture is all too often seen as being at the periphery of policy-making, a secondary concern compared to issues such as finance, security or foreign affairs. The Pandemic has seen many turn to culture as a source of comfort in difficult times, as well as making clear the role of cultural concerns (the norms, values, and behaviors of individuals and groups) in the effectiveness of the response. Cultural institutions, not least libraries, have also been valuable sources of information for responses and put things into context.

Rights matter:
A common theme in the four previous sections has been the idea that people have rights – to information, education, public services and culture. The pandemic has brought home to many the value of these rights, often of course when they are compromised. It has also forced greater awareness and reflection on the tension that can exist between rights – freedom of assembly and the right to health, freedom of speech and the right not to be subject to discrimination.

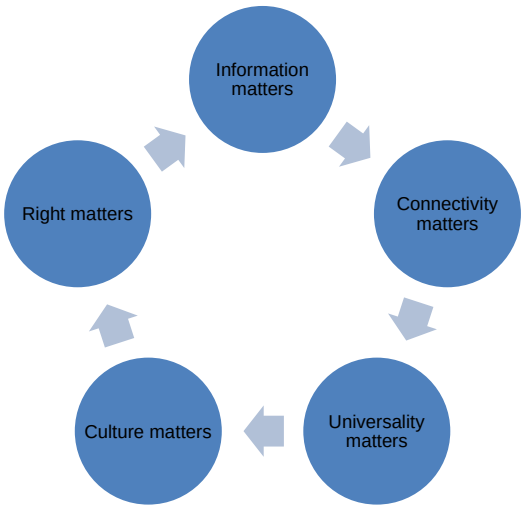

Figure 2: Five key values of libraries in pandemic and post pandemic period

Lessons learned from pandemic for post pandemic period

Here, some useful Lessons learned from pandemic to adopt for post pandemic period are outlined for leaders, libraries, and librarians:

Library leaders:
It is obvious that library leaders are making continuous changes and are interested in sharing and learning from each other in order to provide resources and assistance to their communities in this new environment.

Some of the themes that library leaders should be concerned about include both the challenges and opportunities of retraining and reassigning staffs in either all online or in a hybrid environment that includes some in-person as well as online services. Library leaders should also have effective collaboration with other departments within their communities, local businesses and industries, professional associations, and library consortia (Connaway,2020).

Equipment:
Many libraries should offer hot spots, laptops, chrome books, and tablets to their public and academic communities. However, the need for this equipment has increased and if there are funds to purchase more of this equipment, there is a great demand for them and a short supply available for purchase. Some students, faculty, and library staff may have limited or no Wi-Fi service at home. Librarians can provide equipment and technology access enabling individuals to teach, learn, and work from home, highlighting the digital divide for both community members and library staff.

Library staff:
Some library staff needs to be retrained so they become capable of transforming their workflows to an online environment. Library staffs perceive this as an opportunity to try new ways of working and providing programs, resources, and services. Others may identify this transition as a good challenge, such as creating metadata for open content,

making physical resources available with no or minimal metadata, and providing library users the capabilities to order materials and to have them directly shipped to their homes. Most library staff may feel the intensified pressure of the challenges associated with e-resources, e-textbooks, e-book loan restrictions, and copyright and licensing agreements.

Reference services:
It is advised that reference services that are offered in person or as hybrid models (both in person and virtual) should immediately switch to virtual. Chat and email reference services need to be increased, with library staff having to set up and learn virtual reference services. Reference consultations are suggested to be conducted through video conferencing tools or telephone (Connaway,2020).

Library instruction programs:
Instruction programs, such as story times, author talks, artist exhibitions, and information literacy instruction, should all be offered through video conferencing and webinars. Academic librarians need to assist faculties with preparing online courses and to embed information literacy instructions into courses and virtual learning environments.

Interlibrary loan services:
For some libraries, interlibrary loan may become more heavily used and depended upon. This means that library users are able to directly order materials from certain online sites and have the materials delivered to the individuals' homes. The library staff can retain records of the purchases and provide metadata for discovery based on the order of information.

Although library budgets and staffing restrictions and limitations can be a challenge to the operation of services mentioned above, pandemic uncertain times will make these pressures more concerning. A major concern is how to make the case that the physical library still be very important in a community. Some ideas include promoting and marketing the library's offerings in the online environment as well as cultivating and developing online communities.

CONCLUSION

As in so many other parts of our society, COVID-19 has forced many changes and challenges to the ways in which libraries operate. Although libraries have undergone various pressures and transformations in pandemic times, have experienced emerging roles, sought new technologies and proposed rapid online services; they often look forward to what have not been fulfilled yet, according to their expectations. As predicting the ending time for pandemic is still unknown and libraries are still in their infancy of experiencing unforeseeable problems, it is necessary to plan a unified integrated model for library reopening programs. Apollo project method with regard to library values and goals are the key factors in managing and providing better services for potential library users and researchers; however, practical lessons learned from libraries experiences around the world are also adaptable to post pandemic period and should not be neglected.

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Managing the Administration and Corporate Department of the Universiti Malaya Library during the COVID-19 Pandemic: Challenges and Learning Agility

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ABSTRACT
The COVID-19 pandemic that hit Malaysia in 2020 has become the starting point for University of Malaya Library (PUM) in demonstrating their learning agility and handling of the challenges faced by the Administration and Corporate Division (January 2020) in managing GLAM (Galleries, Libraries, Archives and Museums). The Administrative and Corporate Division of PUM has been managed since the establishment of the Chief Librarian Office. This division comprises of 7 major units namely the Administration Unit, Finance Unit, Human Resource Unit, Training Unit, Maintenance and Infrastructure Unit, Corporate Unit and Media Unit with a total of 16 operating staff and one executive staff. Various problems and challenges were raised in operating all 7 units during the COVID-19 pandemic. All staff have worked from home since the start of PKP 1.0 and subsequently, used a hybrid approach of implementing shifts between the staff. However, this has led to other problems as they have limited interaction with one another, and thus, have to resort to digital and online platforms such as getting instructions and feedback through Whatsapp, emails and others. This is to ensure that their duties can be carried out efficiently. Learning agility is the center to the operation of this division. According to Lombardo and Eichinger (2003), learners' agility is divided into 5 parts, namely mental agility, people agility, change agility, results agility and self-awareness. This clearly demonstrates the importance of having effective leadership in performing duties at the Administrative and Corporate Division during this COVID-19 pandemic.

Keywords: Learning agility; Pandemic COVID-19; Leadership; Library administration; Library management

Pengurusan Bahagian Pentadbiran dan Korporat di Perpustakaan Universiti Malaya semasa Pandemik COVID-19: Cabaran dan Ketangkasan Pembelajaran

ABSTRAK
Pandemik COVID-19 yang melanda Malaysia pada tahun 2020 menjadi titik tolak kepada cabaran, masalah dan ketangkasan pembelajaran yang dihadapi di Bahagian Pentadibaran dan Korporat (Januari 2020) dalam mengurusan GLAM (Galeri, Perpustakaan, Arkib dan Muzium) di Perpustakaan Universiti Malaya. Pengurusan Bahagian pentadbiran dan Korporat PUM telah

diwujudkan sejak dahulu sebagai Pejabat Ketua Pustakawan. Bahagian ini merangkumi 7 unit besar iaitu Unit Pentadbiran, Unit Kewangan, Unit Sumber Manusia, Unit Latihan, Unit Penyelenggaran dan Infrasturktur , Unit Korporat dan Unit Media. Seramai 16 orang staf operasi dan hanya seorang sahaja staf eksekutif. Pelbagai masalah, cabaran yang dihadapi dalam pengendalian kesemua tujuh unit ini ketika pandamik COVID-19. Staf berkerja dari rumah sepenuhkan semasa PKP 1.0 seterusnya secara hybrid dan secara bergilir-gilir. Ini menimbulkan pelbagai masalah dan cabaran kerana masa yang terhad secara bersemua, maka mesyuarat terpaksa dilaksanakan secara online, arahan melalui whatsApp, email dan sebagainya bagi membolehkan kerja berjalan dengan lancar. Ketangkasan pembelajaran merupakan titik tolak pengurusan unit ini. Menurut Lombardo and Eichinger (2003), ketangkasan pembelajar terbahagi kepada 5 bahagian iaitu mental agility, people agility, change agility, results agility dan self-awareness. Ini jelas menunjukkan kepentingan kepimpinan berkesan dalam melaksanakan tugas di Bahagian Pentadbiran dan Korporat ketika pendamik COVID-19.

PENGENALAN

Perpustakaan Universiti Malaya telah dibangunkan di Kuala Lumpur pada tahun 1959. Sejak dari tahun itu pentadbiran perpustakaan diberi nama Pejabat ketua Pustakawan sehingga pada tahun 2020 carta organisasi baru telah menamakan Bahagian Pentadbiran dan Korporat, namun pada tahun Jun 2021 bahagian ini telah ditukar kepada Bahagian Pentadbiran kerana Unit Korporat dibawah pengurusan Ketua Jabatan Perkhidmatan. Bahagian pentadbiran merupakan bahagian yang menguruskan pentadbiran perpustakaan yang terdiri dari beberapa unit iaitu Unit Pentadbiran, Unit Kewangan, Unit Penyelenggaraan dan Pembangunan Infrastruktur, Unit Sumber Manusia, Unit Latihan, Unit Korporat dan Unit Media. Pada 15 Januari 2020 bahagian ini telah dikendali oleh pustakawan kanan telah dilantik untuk mentadbir bahagian ini. Ini merupakan tugas dan tanggungjawab yang berat namun hasil dari kerjasama kerja berpasukan, pengetahunan dan ilmu dalam bidangn kepustakawan, dan ketangkasan pembelajaran dalam kemimpinan membolehkan bahagian ini dapat dikendalikan dengan baik. Terdapat pelbagai cabaran yang dihadapi dalam melaksanakan tugas untuk mengendalikan tujuh unit bagi menjamin pengurusan yang baik untuk Bahagian Pentadbiran Perpustakaan Universiti Malaya. Apabila COVID-19 melanda dunia bermula dari tahun 2019 hingga tahun 2020 dan sekarang telah menyebabkan banyak perubahan dan cabaran serta rintangan perlu dihadapi.

Bahagian ini terdiri daripada staf operasi daripada pelbagai gred jawatan iaitu seramai 18 orang. Unit Pentadbiran yang terdiri daripada Seorang Penolong Pustakawan iaitu S29 yang memantau bukan sahaja unit pentadbiran tetapi juga Unit Media. Staf di Unit Pentadbiran adalah merangkumi Unit Sumber Manusia yang mana diuruskan oleh seorang N19 yang membantu pengendalian berkaitan sumber manusia GLAM iaitu urusan berkaitan dengan cuti staf, kehadiran staf, displin staf dan sebagainya. Manakala Unit Latihan pula adalah berkaitan dengan membantu pengendalian latihan staf iaitu kursus seminar dan sebagainya. Unit Latihan juga membantu mengendalikan pelajar latihan industri di dalam dan luar negara, ia termasuk dalam urusan berhubung dengan fakulti , organisasi, CITRA iaitu urusan perlantikan pelajar latihan industri ini, jadual latihan, laporan dan sebagainya. Unit Pentadbiran juga merangkumi urusan pentadbiran pejabat terdiri daripada inventori peralatan, perolehan peralatan dan keperluan pejabat, pengurusan perlupusan dan sebagainya.

Unit Kewangan terdiri daripada 3 orang staf iaitu seorang W32 dan 2 orang W19. Unit kewangan adalah berkaitan dengan segala urusan pentadbiran kewangan dari segi bajet yang menguruskan belanja mengurus dan dua jenis tabung perpustakaan iaitu Tabung Denda dan Sandri dan Tabung Kemudahan Perpustakaan. Sebelum Unit Promosi dan Korporat juga adalah dibawah tanggungjawab Bahagian Pentadbiran yang mana Unit ini membantu pengurusan promosi perpustakaan iaitu penggunaan sosial media perpustakaan seperti facebook, Instagram, Twitter dan penghasilan video korporat perpustakaan yang dilaksanakan oleh seorang S44. Manakala Unit Media terdiri daripada pemantauan oleh S29 dan 3 orang staf iaitu seorang S22, seorang N22 dan Seorang N11 yang membantu pengurusan Unit Media. Sebelum ini Unit Media adalah dibawah pengawasan Pustakawan S44 namun setelah berlakunya perubahan dalam carta organisasi perpustakaan maka pada tahun 2021 pengurusan Unit Media adalah dibawah pemantauan S29.

Jadual 1: Bilangan Unit dalam Bahagian Pentadbiran PUM yang juga melibatkan jawatan dan tugas

Bil	Unit	Jawatan	Tugas/Tanggungjawab
1	Unit Pentadbiran	Penolong Pustakawan (S29) - 1 Pembantu Tadbir (S26) - 1 Pembantu Operasi (N11) - 1 Pembantu Awam (H11) - 5	Pengurusan inventori GLAM Urusan perlupusan GLAM Pengurusan perolehan peralatan, perabot dan keperluan pejabat Pengurusan kebersihan persekitaran GLAM Pengurusan kenderaan Perpustakaan Pengurusan dokumen/surat menyurat GLAM
2	Unit Sumber Manusia	Pembantu Tadbir (N19) – 1	Pengurusan cuti dan cuti sakit staf Pengurusan kehadiran staf Pengurusan jawatankuasa displin staf Pengurusan peperiksaan staf Pengurusan penempatan staf KPI staf dan JD staf
3	Unit Latihan	Pembantu Tadbir (S22) - 1	Pengurusan latihan staf dalam dan luar negara Pengurusan kursus dan persidangan staf dalam dan luar negara Pengurusan pelajar latihan industri Pengurusan perlantikan jawatankuasa-jawatankuasa perpustakaan
4	Unit Kewangan	Penolong Akauntan (W32) -1 Pembantu Takbir Kewangan (W19) - 2	Pengurusan Belanja Mengurus GLAM Pengurusan kewangan Tabung Denda dan Sandri Pengurusan kewangan Tabung Kemudahan Perpustakaan Pengurusan Tabung Muzium Pengurusan Tabung Galeri
5	Unit Penyelenggaraan & Infrastruktur	Penolong Jurutera (JA29) – 2	Pengurusan Penyelenggaraan GLAM secara berkala Pengurusan projek pembangunan infrastruktur Perpustakaan
6	Unit Media	Pembantu Pustakawan (S22) -1 Pembantu Tadbir (N22) – 1	Pengurusan Koleksi Unit Media Pengurusan Perkhidmatan Unit Media

		Pembantu Operasi (N11) - 1	Pengurusan pentadbiran Unit Media Pengurusan Perolehan Unit Media Pengurusan Tempahan Auditorium, Studio, Peralatan AV Unit Media
7	Promosi dan Korporat	Pustakawan Kanan (S44) – 1	Promosi Perpustakaan di social media dan laman web Perpustakaan Menghasilkan poster untuk events Menghasilkan Video Korporat Perpustakaan

Dalam memastikan keseluruhan Bahagian Pentadbiran ini dikendalikan dengan berkesan dan baik maka perlunya strategi bagi memastikan pengurusan dapat dilaksanakan dengan baik. Dengan kepantasan pembelajaran/*learning agility* perlu diamalkan dalam pengurusan Bahagian Pentadbiran ini. Keperluan kepimpinan yang berkesan perlu dilaksanakan bagi menjamin kecemerlangan urusan semua Unit tambahan pula bermulanya pandemik COVID-19 di mana pelbagai aktiviti yang tidak dapat dilaksanakan. Ketangkasan pembelajaran ialah kemampuan bergerak dengan pantas dan lancar; kepintaran "dan" kesesuaian untuk menganggap dan menghasilkan hasil dengan cepat; minat kognitif" */ learning agility are "the ability of moving swiftly and smoothly; smartness" and "the suitability to presume and produce outcomes rapidly; cognitive keenness"* (Murphy, 2001). Menurut (DeRue et al., 2012) ketangkasan pembelajaran ialah "dua proses psikologi sebagai kelajuan persepsi dan kognisi fleksibel" / *learning agility are "two psychological processes as perceptual speed and flexible cognition".*

Manakala bagi Lombardo and Eichinger (2003), menyatakan ketangkasan pembelajaran terbahagi kepada 5 bahagian iaitu:-
Ketangkasan mental (*Mental Agility*) - merangkumi mengatasi masalah dan kerumitan dengan cara yang unik, membuat hubungan baru, dan selalu ingin tahu.

- Ketangkasan perseorangan (*People Agility*) - bersikap terbuka terhadap orang lain, menikmati interaksi dengan pelbagai kumpulan, memberikan yang terbaik pada orang lain.
- Ketangkasan perubahan (*Change Agility*)- kesediaan untuk memimpin usaha transformasi, terus menerus meneroka pilihan baru.
- Ketangkasan hasil/keputusan (*Result Agility*) - memberikan hasil dalam situasi sukar, menyahut cabaran, memberi inspirasi kepada orang lain untuk mencapai lebih banyak daripada yang mereka fikirkan mungkin.
- Kesedaran diri (*Self-Awareness*) - reflektif, memahami kekuatan dan kelemahan, mencari maklum balas dan pandangan peribadi.

Objektif

Terdapat 3 objektif utama iaitu:

- Mengenalpasti kebersediaan pustakawan dalam menguruskan Bahagian Pentadbiran & Korporat PUM.
- Ketangkasan pembelajaran / *learning agility* oleh pustakawan dalam menyesuaikan diri dan menguruskan Bahagian Pentadbiran & Korporat.

- Cabaran yang dihadapi ketika pendamik COVID-19 kepada Pengurusan Perpustakaan Universiti Malaya.

Ini merupakan perkara-perkara yang penting untuk kita mengupas bahawa kejayaan Bahagian Pentadbiran adalah bergantung kepada kebolehan pustakawan berjaya dalam ketangkasan pembelajaran tersebut. Methdologi yang digunakan dalam kertas kerja ini ialah kualitatif iaitu berpandukan kepada pengalaman dan pemerhatian dan pandangan pustakawan sendiri.

PENGURUSAN BAHAGIAN PENTADIBRAN & KORPORAT PERPUSTAKAAN UM

Mentadbir Bahagian Pentadbiran & Korporat merupakan satu cabaran yang besar bagi pustakawan kerana baru sahaja dilantik ke jawatan tersebut pada 15/1/2020 dan terpaksa pula berdepan dengan COVID-19 yang menyebabkan corak pengurusan Bahagian ini juga terpaksan ditukar kepada mudium komunikasi yang berbeza dan pertama kalinya ia diuruskan oleh seorang sahaja pustakawan yang sebelum ini ditadbir oleh 3 orang pustakawan. Dengan pengurusan 7 unit dibawahnya dan penyeliaan 19 orang staf keseluruhannya. Cabaran-cabaran atau kesukaran-kesukaran dilalui seperti untuk menghasilkan senarai inventori perpustakaan, cabaran untuk menguruskan kewangan yang tidak pernah diuruskan sebelum ini, menguruskan unit penyelenggaraan dengan pelbagai kertaskerja terpaksan dihasilkan, pengurusan Sumber Manusia untuk keseluruhan GLAM, menghasilkan takwim latihan dan sebagainya menjadi titik tolak kejayaan Bahagian ini.

Unit Pentadbiran

Unit ini adalah penting dalam kerja-kerja inventori peralatan perpustakaan. Satu senarai peralatan telah dapat dihasilkan bagi mengetahui tentang senarai inventori perpustakaan. Senarai ini membantu memudahkan untuk perancangan pembelian peralatan baru atau perabut baru untuk perpustakaan. Satu senarai pelupusan peralatan juga telah dapat dihasilkan bagi melupuskan peralatan lama dan sebelum membuat penggantian peralatan baru. Ini merupakan satu proses yang rumit kerana setiap peralatan harus dikenalpasti dan disemak. Begitu juga dengan semua peralatan yang berada di luar Perpustakaan Utama iaitu untuk perpustakaan cawangan dan Perpustakaan Khusus. Satu templete khas telah dikeluarkan mengikut standard formet bagi membolehkan ianya dishare dan digunapakai oleh semua perpustakaan. Budget juga telah dibentangkan untuk di Tabung Denda dan Sandri berkaitan dengan pembelian perabot dan peralatan baru keperluan perpustakaan. Ini merupakan sesuatu yang baru bagi pustakawan untuk menghasilkan kertaskerja berkitan dengan keperluan peralatan dan perabot dan menjadi urusetia kepada mesyuarat tersebut yang telah dijalankan sebanyak 2 kali untuk tahun 2020 dan pada tahun sekali untuk 2021.

Pengurusan kenderaan perpustakaan telah ditambahbaik bagi membolehkan pemeriksaan berkala dapat dijalankan dan dilakasanakan mengikut jadual yang ditetapkan. Pentadbiran ini telah ditambahbaik untuk menjadikan ia lebih cekap dan berkesan.

Unit Kewangan

Unit ini penting bagi membolehkan pengurusan kewangan perpustakaan dapat beropersi dengan baik. Sesuatu yang baru untuk pustakawan kerana pustakawan tidak didedahkan dengan pengurusan kewangan Universiti, dasar, polisi dan pekeliling perbendaharaan. Ini merupakan satu cabaran dalam membuat keputusan untuk memastikan pengerusan kewangan dapat dijalankan secara betul dan bijak sana. Beberapa keputusan penting perlu dilaksanakan bagi membolehkan bajet dapat digunakan pakai dengan baik kerana COVID-19 menyebabkan kebanyakan PTJ tidak dapat menghabiskan kewangan mereka sepeti yang telah dirancang. Tahun 2020 dan 2021 merupakan tahun yang penuh cabaran untuk staf dan juga pustakawan yang terlibat dengan kewangan. Sungguhpun begitu beberapa projek yang telah dirancang daripada Tabung Denda & Sandri, Tabung Kemudahan Perpustakaan dan Tabung Belanja Mengurus telah dapat diuruskan dengan baik.

Satu mesyuarat Tabung Denda & Sandri telah diadakan iaitu pada 3/5/2020 dan pada tahun 2021 ialah pada 15/7/2021. Untuk Tabung Kemudahan telah dilaksanakan sebanyak 3 kali untuk tahun 2020 iaitu pada 29/6/2020, 10/8/2020, 22/10/2020 dan ketiga-tiga mesyuarat ini dipengerusiakan oleh Naib Canselor Universiti Malaya, banyak peruntukan peralatan yang telah diluluskan untuk pembelian seperti Mesin Layan Diri, Pengimbas barcode, Advertising Display Kiosk, digital Library Assistant dan sebagainya. Ini merupakan tahun terbanyak mesyuarat Tabung Kemudahan dilaksanakan dan banyak kertaskerja yang telah dibentang dan pembelian telah dilaksanakan untuk memberikan perkhidmatan dan kemudahan yang terbaik kepada pengguna perpustakaan. Ini memerlukan ketangkasan pembelajaran kepada pustakawan dalam menghasilkan kertaskerja, menjadi urusetia, menyediakan minit mesyuarat dan sebagainya bagi membolehkan kewangan perpustakaan dapat ditadbir dan diuruskan secara cekap dan berkesan walaupun ketika pandemic. Mesyuarat ini juga dilakukan secara atas talian dengan menggunakan google meet dan juga secara bersemuka. Pustakawan juga terpaksa mendapatkan nasihat dari pejabat bendahari UM bagi membolehkan mesyuarat dapat dikendalikan dengan baik, mendapatkan nasihat untuk menghasilkan kertaskerja yang baik dan mengikut standard format.

Unit Penyelenggaran & Pembangunan Infrastruktur

Pada tahun 2020 merupakan tahun mencabar bagi pustakawan untuk berhubung dan berkomunikasi dengan pihak Jabatan Pembangunan & Penyelenggaraan Harta Benda atau lebih dikenali sebagai JPPHB. Terdapatnya pelbagai projek yang telah dijalankan dan dirangka oleh unit ini dan perhubungan secara langsung dengan Pengarah dan staf JPPHB membolehkan kerja-kerja pembangunan dapat dijalankan dengan baik termasuk dengan perkara-perkara berkaitan dengan penyelenggaraan teknikal iaitu civil, meknikal, elektrik. Antara projek yang telah dibentangkan untuk mendapatkan bujet, menghantar JAPRUM, JKICT, Jawatankuasa Perolehan untuk kelulusan dengan menghasilkan kertaskerja dan membentangkan kepada jawatankuasa tersebut.

Jadual 2: Projek Penyelenggaran dan Pembangunan Infrastruktur tahun 2020

Bil	Tajuk Projek	Kelulusan	Proses
1.	Perolehan Kamera Litar Tertutup (CCTV) Perpustakaan Utama, Perpustakaan Peringatan Za'ba, Perpustakaan Perubatan, Perpustakaan Undang-undang dan Arkib Universiti Malaya	Tabung Kemudahan Perpustakaan (10 Ogos 2020)	Proses mendapatkan kelulusan daripada JKPICT yang akan bermusyuarat pada 11 November 2020
2.	Perolehan Kerja Mengecat Keseluruhan Bahagian Luar Perpustakaan Utama UM	Tabung Kemudahan Perpustakaan (10 Ogos 2020)	Proses membuat sebut harga oleh pihak JPPHB
3.	Pembiayaan Naiktaraf Tandas Umum Aras 1 Perpustakaan Utama UM	Tabung Kemudahan Perpustakaan (10 Ogos 2020)	Proses membuat sebut harga oleh pihak JPPHB
4.	Naiktaraf bilik pegawai BSM dan SickBay Perpustakaan	Tabung Denda dan Sandri Perpustakaan (19 Februari 2020)	Perolehan peralatan SickBay telah selesai Perolehan perabot dalam proses sebut harga Naiktaraf telah selesai
5.	Kerja ubahsuai dan naiktaraf bilik Pustakawan Unit Media, Auditorium Karyawan, Bilik Mesyuarat Pendeta, Bilik Mesyuarat Ilmuan	Tabung Denda dan Sandri Perpustakaan (19 Februari 2020)	Proses mendapatkan kelulusan daripada JPRUM oleh JPPHB
6.	Projek naiktaraf tandas kepada Maker Space Perpustakaan	Tabung Denda dan Sandri Perpustakaan (19 Februari 2020)	Proses membuat sebut harga oleh pihak JPPHB
7.	Ubahsuai Pejabat Ketua Pustakawan	Tabung Denda dan Sandri Perpustakaan (19 Februari 2020)	Proses mendapatkan kelulusan daripada JPRUM oleh JPPHB
8.	Naiktaraf PA System Perpustakaan	Tabung Denda dan Sandri Perpustakaan (19 Februari 2020)	Proses kelulusan JPPHB

9.	Naiktaraf dan baikpulih lanskap Perpustakaan dan ruang 24 jam	Tabung Denda dan Sandri Perpustakaan (19 Februari 2020)	Proses mendapatkan kelulusan daripada JPRUM oleh JPPHB
10	Projek penempatan Galeri Seni UM yang baru (2021)	Peruntukan Universiti tahun 2021	Proses penyediakan kertas kerja dan pencarian penempatan baru serta peruntukan yang diperlukan
11	Projek rejuvinasi Aras Satu Perpustakaan Utama UM (2021)	Peruntukan Tabung Kemudahan Perpustakaan 2021	Proses penyediakan kertas kerja dan peruntukan yang diperlukan
12	Projek menaiktaraf bas lama UM (2021)	Peruntukan Tabung Kemudahan Perpustakaan 2021/mendapatkan sponsor dari luar	Proses penyediakan kertas kerja dan peruntukan yang diperlukan

Unit Sumber Manusia

Unit ini juga menghadapi cabaran yang sangat mencabar untuk tahun 2020 kerana bukan sahaja terpaksan berdepan dengan pelbagai masalah sumber manusia iaitu pandemic telah menyebabkan masa bekerja staf iaitu WOS atau WFH. Setiap masa perpustakaan perlu mengemaskini status kehadiran setiap staf bergantung kepada jadual tugas yang telah ditetapkan sebara bergilir-gilir iaitu konspe 3-2 iaitu 3 hari di rumah atau 3 hari di tempat kerja. Surat kehadiran staf juga perlu disediakan oleh Bahagian Pentadbiran. Staf perlu dipantau dari segi cuti mereka, jadual tugas, kerja-kerja/tugas-tugas yang perlu dilaksanakan di rumah, memantau log kerja harian dan sebagainya. Cabaran besar juga dihadapi pada tahun 2020 ialah dimana Deskispri Tugas telah diimplementasikan di dalam sistem portal UM. Setiap staf perlu melaksanakan dan penyediaan taklimat kepada staf dilaksanakan sendiri oleh pustakawan Bahagian pentadbiran. Beliau juga telah melihat setiap bahagian untuk mengedit dan menyerahkan kepada bahagian untuk melaksanakan pertukaran bagi mengelakkan kemasukkan rekod yang tidak tepat. GLAM mempunyai keseluruha staf seramai 205 orang termasuk di Bachok Kelantan. Pada tahun 2020 juga staf mengambil peperiksaan dan keseluruhan semua staf lulus dengan cemerlang. Pustakawan sendiri yang membuat soalan dan juga mengambil dari bank soalan untuk ditaip semula kerana tiadanya softcopy. Pada tahun 2021 sekali lagi UM telah membuat Penilaian Prestasi (KPI) yang baru dengan penetapan Kluster iaitu Kluster Pengurusan, Kluster Rakan Sekerja, Kluster Pelanggan Dalam dan Kluster Pelanggan Luar atau Kluster Pelajar. Dengan adanya perhubungan yang baik dengan pihak BSM telah membolehakan taklimat KPI telah diberikan pada staf GLAM sebanyak 2 kali iaitu pada 16/6/2021 & 17/6/2021. Hubungan baik dengan pihak BSM membolehkan taklimat tersebut boleh dilaksanakan pada malam 16/6/2021 dan pagi 17/6/2021 bagi membolehkan staf perpustakaan bagaimana untuk mengeisi KPI dan kluster Poise. Bukan itu sahaja Pustakawan juga telah menyediakan kit untuk sumber manusia kepada Pengurusan

Perpustakaan yang terdiri daripada carta organisasi, carta perjawatan, carta fungsi, statistik perjawatan, portfolio setiap staf perpustakaan. Telah berlaku juga penempatan staf kerana adanya perubahan carta oraganisasi. Pada tahun 2020 juga perolehan dan pengkatalogan telah dilaksnakan secara berpusat dan perpustakaan khusus melaksanakan tugas-tugas perkhidmatan, literasi maklumat dan kemudahan perpustakaan.

Unit Latihan

Unit latihan ini terbahagi kepada 2 iaitu latihan untuk staf bagi pembangunan kompetensi mereka dan juga pengurusan latihan industri pelajar luar dan dalam UM. Setiap tahun pelajar latihan industri akan membuat latihan industri tanpa bayaran dan pada tahun 2020 telah bermulanya latihan industry dengan bayaran dengan penyediaan kertas kerja untuk kelulusan pengurusan perpustakaan berdasarkan pekeliling yang dikeluarkan oleh kementerian tentang keperluan membayar pelajar ini yang mana pada mulanya bayaran sejumlah RM25.00 sehari untuk 5 jam dan bayaran mengikut hari namun kerana masalah kewangan pihak perpustakaan telah membuat keputusan untuk hanya membayar RM500.00 sahaja kerana memandangkan permintaan yang tinggi pelajar untuk mendapatkan latihan industri di PUM. Pelajar ini perlu melaksanakan beberapa proses pengambilan iaitu proses penghantaran CV mereka kemudian pemilihan dan mengeluarkan surat setuju terima, seterusnya surat rasmi perlu dikeluarkan oleh CITRA dengan menulis penerimaan oleh Perpustakaan. Penyediaan jadual pelajar tersebut dibuat dan penyediaan tugas-tugas yang boleh dilakukan yang ditetapkan oleh pustakawan Bahagian Pentadbiran. Setelah latihan penyediaan laporan oleh pelajaran dan feedback ke fakulti dilaksanakan oleh pustakawan Bahagian pentadbiran yang menjadi penyelia kepada semua pelajar tersebut. Perpustakaan menerima pelajar dari dalam dan luar negara. Unit latihan perlu mastikan setiap staf perpustakaan telah mengikuti latihan sekurang-kurang sekali untuk setiap tahun.

Jadual 3: Rumusah latihan/kursus 2020

i. Rumusan Latihan/Kursus staf Perpustakaan (2020)

   i. Jumlah staf Perpustakaan adalah **189 orang (2 staf baru)**

   ii. Jumlah kursus telah di hadiri oleh semua staf Perpustakaan **setakat 9/11/2020 adalah 534.5 hari (berdasarkan pengiraan rekod di portal)**

   iii. 8 orang staf akan menghadiri kursus pada (11 & 12/11/2020 adalah 8 orang = 8 hari termasuk staf baru Puan Atiqah

   iv. Jumlah kursus dihari staf setakat 12/11/2020 adalah 542.5 hari 6 orang staf masih tidak mempunyai kursus kerana 4 orang bakal berpencen, 2 orang staf baru yang melapor diri pada 9/11/2020 dan seorang pemandu. Nama-nama yang terlibat seperti di bawah :

      i. Encik Habik Saat Haji Zainal - Bakal Berpencen

ii. Encik Ibrahim Hussein - Bakal Berpencen
iii. Encik Mohamad Anuwa Ab Rahman - Bakal Berpencen
iv. Puan Fairuz Nawwar Mansor – Staf baru
v. Encik Nazierul Haziq Bin Noor Hassan – Staf baru
vi. Napidi Ahmad - Driver KP

Bagi tahun 2021 sehingga kini seramai 32 orang sahaja yang tidak lagi menghadari kursus. Berdasarkan rekod ini 100% staf perpustakaan akan mengikut kursus anjuran Perpsutakaan UM atau Luar. Perpustakaan telah mengadakan latihan secara inhouse bagi dapat menjimatkan kos pengendalian kursus dan pustakawan Bahagian Pentadbiran adalah penyumbang terbesar latihan untuk staf PUM untuk tahun 2021. Berikut adalah jadual latihan staf Perpustakaan:-

Jadual 4: Kursus yang dijalankan pada tahun 2020

Bil	**Tajuk Kursus**	**Tarikh**	**Jumlah Peserta**	**Tempat**
1.	Bengkel Latihan Pangkalan Data Incites	6 Mac 2020 9.00 pagi – 12.00 tengahari	18 orang	Komputer Lab C, Aras 4, Perpustakaan
2.	Bengkel Ahli Jawatankuasa Penilaian Prestasi (KPI), Perpustakaan UM	9 Mac 2020 9.00 pagi – 5.00 petang	31 orang	Galeri Seni, Aras 5, Bangunan Canseleri
3.	Bengkel Pengwasapan & Rawatan Bahan Bercetak	12 Mac 2020 9.00 pagi – 4.30 petang	31 orang	Bahagian Pemuliharaan dan Pemeliharaan
4.	Bengkel Perolehan bagi Persediaan Audit Dalaman Universiti Malaya	23 Julai 2020 9.00 pagi – 11.00 pagi (Sesi 1) 11.00 pagi – 1.00 tengahari (Sesi 2)	21 orang (sesi 1) 17 orang (sesi 2)	Makmal C, Aras 4, Perpustakaan
5.	Leadership Development Programme for Librarians and Curators	14 – 15 September 2020	50 orang	PAUM

6.	Bengkel Synergies Ebook And Journal In Your Research Journey Workshop	18 September 2020	-	Auditorium
7.	Bengkel Penyediaan Kursus Literasi Maklumat Baharu (Kluster SHE)	24-25 September 2020	10 orang	Makmal C, Perpustakaan
8.	Geese Principles : 1 Team 100% Engagement	5 & 6 Oktober 2020	25 orang (sesi 1) 25 orang (sesi 2)	PAUM
9.	Latihan Semakan Title List Ebooks 2020	8 Oktober 2020	9 orang	Bilik Pendeta

Jadual 5: Kursus yang dirancang untuk tahun 2021

Bil	Nama Kursus	Tarikh	Masa	Penceramah	Sasaran
1	Interpersonal Communication	22/6/2021 (Selasa)	9.00 pagi - 2.00 petang	Shamsiah Abu Bakar	Staf Sokongan
2	Public Speaking	24/6/2021 (Khamis)	9.00 pagi - 1.00 petang	Puan Shamsiah Abu Bakar	Staf Sokongan
3	Tempayan dan Martaban : Sejarah, pengenalan dan koleksi MSA	1/7/2021 (Khamis)	10.00 pagi – 12 tengahari	En Aziz Abd Rashid	Semua
4	Embedded Librarians	10/7/2021 (Jumaat)	11.00 pagi - 12.15 tengahari	Dr Khasiah Zakaria	Pustakawan
5	Microsoft Teams untuk Kolaborasi, Produktiviti dan Perkongsian Pengetahuan: Asas	15/7/2021 (Khamis)	9.30 pagi - 12.30 tengahari	En Mahbob Yusof	Pustakawan
6	Pengenalan kepada Cataloging Module, Blue Cloud Analytic untuk penjanaan laporan koleksi perpustakaan	23/7/2021(Jumaat)	9.00 pagi – 12.00 tengahari	Puan Zaharah Ramly	Semua

7	Bengkel Digital Marketing	28/7/2021 (Rabu)	9.00 pagi – 4.30 petang	Puan Zanaria Saupi Udin	S29 dan keatas termasuk Pustakawan
8	Artifak Seramik: Satu Pengenalan	29/7/2021 (Khamis)	9.30 pagi – 12.00 tengahari	En Aziz Abd Rashid	Semua
9	Pengenalan kepada Undang-Undang Hak Cipta	5/8/2021 (Khamis)	10.00 pagi – 11.30 pagi	Puan Ratnawati Sari Mohamad Amin	Semua
10	All for One: Teamwork	12/8/2021 (Khamis)	9.00 pagi - 1.00 petang	Shamsiah Abu Bakar	Staf Sokongan
11	Persidangan ICOLIS 2021	18-19 Ogos 2021 (Rabu & Khamis)	9.00 pagi – 5.00 petang	Perpustakaan & FSKTM	Pustakawan
12	Literasi Maklumat	25/8/2021 (Rabu)	10.00 pagi – 12.00 tengahari	Puan Maziah Salleh	Staf Sokongan
13	Pemakanan Sihat	27/8/2021 (Jumaat)	10.00 pagi – 11.00 pagi	Dr Sareena Hanim Hamzah	Semua
14	All for One: Leadership	8/9/2021 (Rabu)	9.00 pagi – 1.00 petang	Puan Shamsiah Abu Bakar	Staf Sokongan
15	Bagaimana Menulis Rujukan kepada Bahan Perundangan?	15/9/2021 (Rabu)	10.00 pagi - 11.30 pagi	Puan Ratnawati Sari Mohamad Amin	Semua
16	Personal Development Plan & Action	30/9/2021 (Khamis)	9.00 pagi – 1.00 petang	Puan Shamsiah Abu Bakar	Staf Sokongan

Unit Media

Pengurusan unit media adalah seperti sebuah Perpustakaan Khusus kerana prosesnya adalah sama seperti perpustakaan khusus iaitu terdapatnya perolehan (pembelian koleksi

AV), pengkatalogan bahan-bahn media, perkhidmatan dan kemudahan juga disediakan oleh unit ini iaitu pinjaman kolek media dan kemudahan auditorium dan studio untuk staf dan pelajar UM. Proses koleksi piring hitam khadiah lama merupakan backlog yang akan dilaksanakan secara kerja berpasukan dan projek. Bahagian Pengkatalogan dan Metadata akan mengkatalog bahan tersebut dan senarai akan disediakan oleh Unit Media bagi membantu mempercepatkan proses bahan tersebut. Perancangan yang teliti dan menyeluruh penting bagi Unit ini terus memberikan perkhidmatan dan kemudahan kepada pengguna perpustakaan. Projek sederhana untuk membuat rejuvinasi Unit Media telah dilaksanakan bagi menjamin kualiti perkhidmatan dan kemudahan kepada pengguna.

Unit Promosi & Korporat

Promosi yang dilaksanakan sebelum ini adalah tidak menyeluruh dan tidak dapat dilaksnakan dengan skala yang besar namun dengan adanya unit ini dapat membantu perlaksanaan promosi untuk PUM. Promosi adalah penting bagi memberikan imej kepada PUM dan branding yang baik juga mampu memberi *visibility* kepada PUM. Beberapa perancangan telah dirancang untuk promosi GLAM antaranya ialah menyediakan post-post setiap hari di laman web, Facebook, twitter dan Instagram PUM, poster dan bunting yang menarik untuk sebarang events PUM, mengketengahakan program webinar PUM untuk pengguna di dalam dan luar UM, standard templete untuk sebarang pembentangan di dalam dan luar UM dan sebagainya yang dirancang dengan teliti. Video korporat PUM adalah dalam proses iaitu storyboard video korporat ini telah dirangka dan telah disharekan kepada pengurusan perpustakaan untuk meneliti storyboard tersebut bagi mendapatkan komen dan pada masa yang sama staf fotografi dalam proses menyediakan gambar-gambar yang perlu bagi mempercepatkan proses penyediaan video korporat tersebut. Buat masa ini Unit promosi dan korporat tidak lagi dibawah pentadbiran tetapi telah dibawah pemantauan Ketua Jabatan Perkhidmatan dengan perancangan melaksanakan promosi dan korporat secara projek dengan ini pasukan kerja dapat diwujudkan untuk membolehkan proses kerja ini bukan menjadi beban S44 yang ada sekarang.

KETANGKASAN PEMBELAJARAN DALAM PENGURUSAN DAN PERLAKSANAAN

Keseluruhan daripada semua unit-unit ini jelas menunjukkan bahawa tugas dan tanggungjawab bahagian Pentadbiran adalah berat dan memerukan ketangkasan pembelajaran yang tinggi. Jika dilihat dari sudut ketangkasan mental/*mental agility* jelas pustakawan perlu kuat dalam mengatasi masalah dan kerumitan yang dihadapi. Setiap masalah perlu diselesaikan dengan kadar segera kerana ia melibatkan keputusan untuk beberapa unit yang terlibat. Keinginan ingin tahu dan bekerja dengan tahap yang pantas membolehkan keputusan untuk setiap unit dapat dilaksanakan secara serentak. Oleh kerana hanya seorang sahaja pustakawan yang melaksanakan keputusan untuk bahagian maka perlu adanya kerja berpasukan yang tinggi bagi membolehkan setiap keputusan tidak berlandaskan keputusan sendiri sahaja tetapi pandangan dan pendapat staf sangat membantu dalam melaksanakan keputusan. Pendapat Ketua Pustakawan dan Pengurusan Perpustakaan adalah penting dalam membuat keputusan untuk Bahagian

Pentadbiran. Keputusan juga dibuat dengan mendapatkan pandangan daripada ptj lain seperti bahagian Sumber Manusia, JPPHB, Ptj Fakulti dan sebagainya.

Ketangkasan perseorangan (*People Agility*) adalah sangat penting bagi ketangkasan pembelajaran ini ialah kerana sikap keterbukaan dapat membantu dalam melaksanakan sesuatu keputusan, semangat kerjasama yang tinggi dapat membantu pustakawan untuk mudah bergaul dengan sesiapa sahaja dari gred rendah ke gred tinggi. Tambahan pula 21 tahun bekerja di UM membolehkan beliau kenal setiap orang yang bekerja di PUM dan dengan ini to *build repo* dikalangan staf tidak menjadi masalah kepada pustakawan. Pengurusan Sumber Manusia adalah penting untuk pustakawan mempunyai people agility kerana dengan cara ini staf seramai 205 orang ini dapat berinteraksi dan bekerjsama dalam memasitkan PUM diuruskan dengan baik. Kerjasama dengan pihak BSM UM juga adalah penting bagi mendapatkan penjelasan, penerangan dan adanya Whatsapp group dikalangan pentadbir UM membolehkan keputusan dapat disampaikan kepada staf dengan kadar segera. Contoh untuk melaksanakan bengkel KPI dalam masa beberapa minit sahaja keputusan dapat dibuat untuk membolehkan bengkel tersebut di buat dengan kadar segera dan pada tarikh yang sama dan pada waktu malam iaitu lepas waktu kerja staf BSM masih boleh lagi membantu dan mahu mengorbankan waktu reat beliau bagi melaksanakan bengkel tersebut. Ia adalah agak sukar untuk pustakawan menyampaikan taklimat tersebut kerana hanya orang BSM yang pakar dalam memberikan penerangan mengenai perkara ini.

Ketangkasan perubahan (*Change Agility*) adalah penting bagi seorang pustakawan kerana tanpa semangat dan perasaan ingin berubah tidak mampu untuk menggerakkan Bahagian Pentadbiran kerana PUM baru sahaja menerima Ketua Pustakawan baru yang ingin melaksanakan perubahan kepada organisasi bagi menjamin PUM terus maju kehadapan. Transformasi perlu dilaksanakan bagi mengatasi masalah pandamik yang mana staf tidak sepenuhnya bekerja di organisasi dengan ini pelbagai cara komunikasi yang baru perlu seperti penggunaan Whatsapp, google meet (untuk mengadakan mesyuarat atas talian) dan sebagainya. Ini penting bagi kelangsungan kerja dan membuat keputusan dalam organisasi. Walaupun kerja terpaksa dilaksanakan dari rumah namun setiap keputusan yang dibuat perlu mendapat sokongan semua dan medium komunikasi sangat penting. Pustakawan akan bekerja tidak kira masa untuk membolehkan segala urusan pentadbiran dapat dilaksanakan segara segera. Pelbagai bentuk dokumen yang perlu disediakan bagi menjamin kelangsungan urusan pentadbiran berjalan lancar.Staf juga sanggup bekerja tidak kira masa kerana kerja berpasukan penting bagi memastikan segala tugas dapat dilaksnakan dengan baik. Latihan yang dilaksanakan secara atas talian membolehkan ilmu baru ini dapat digunakan oleh semua kerana jumlah staf yang boleh mengikuti kursus dan latihan atas talian adalah lebih ramai dan memandangkan mereka berada dirumah.

Dalam pandemik ini perlu adanya ketangkasan hasil/keputusan (result agility) kerana kesukaran dan kekangan waktu bekerja di pejabat menyukarkan membuat keputusan dan kerja menjadi lebih lambat, maka perlunya semangat yang tinggi untuk menyahut sebarang cabaran yang mendatang. Dengan mampun membuat keputusan dalam keadaan yang sukar ini membolehkan pustakawan memberikan inspirasi dan sokongan kepada staf adalah kejayan dalam organisasi. Latihan yang diberikan juga dapat memberikan semangat dan inspirasi kepada staf dalam organisasi kerana ia dilaksanakan oleh pustakawan sendiri dalam memberikan latihan atau kursus tersebut. Keberhasilan

sesuatu projek itu dapat menyuntik semangat kepada semua dalam organisasi. Ini jelas dalam projek-projek penyelenggaraan dan pembangunan infrastruktur, Unit Latihan, Unit Sumber Manusia dan sebagainya.

Dalam keberadaan COVID-19 ini ramai yang duduk dirumah membolehkan kesedaran diri/self-awareness menjadi teman untuk lebih memperbaiki diri, memikirkan cara untuk lebih maju dengan memikirkan cara terbaik untuk melaksanakan sesuatu. Ia menjadi eye opener kepada pustakawan kerana perlunya kemahiran baru untuk untik membolehkan pengguna PUM dapat perkhidmatan terbaik walaupun perpustakaan tidak dibuka untik tempoh yang lama, namun perkhidmatan masih lagi boleh dilaksanakan dengan cara lain. Ketangkasan memperlajari sesuatu itu dengan kadar yang cepat dan pantas menjamin PUM terus maju kehadapan. Pelbagai langkah pembaharuan telah diambil bagi melihat kekuatan dan kelemahan PUM.

Dalam kita melihat ketangkasan pustakawan, tidak dapat dinafikan juga staf yang berada di bahagian pentadbiran juga memerlukan ketangkasan pembelajaran bagi membolehkan kejayaan Bahagian ini. Ini jelas dimana disetiap unit tersebut terpaksa berubah bagi menjayakan setiap unit yang mereka berurusan dengan pustakawan. Faktor penting ialah kesediaan mereka dari segi ketangkasan mental kerana dengan adanya perubahan yang dibawa oleh pustakawan menyebabkan mereka juga terpaksa berubah dengan setiap arahan yang diberikan kerana setiap unit beban kerja telah berubah mengikut perubahan. Penggunaan sosial media dan medium komunikasi yang berubah meyebabkan setiap mesyuarat yang dilaksanakan secara atas talian dan tidak boleh bersemuka untuk pustakawan memberikan arahan. Tugas-tugas yang berubah juga mneyebabkan mereka terpaksa akur, contoh task baru seperti kewujudan JD, perubahan formet latihan industri yang diterapkan, latihan inhouse yang dijalankan sendiri oleh bahagian, pengendalian majlis yang diarahkan oleh pustakawan, pelbagai laporan, kit sumber manusia yang terpaksan dibuat menyebabkan hubungan komunikasi iaitu ketangasan perseorangan menyebabkan mereka juga kena menjalin hubangan yang baik dengan pihak luar Ptj bagi membolehkan setiap arahan pustakawan dapat dilaksanakan dengan baik dalam mendapatkan maklumat dan bantuan.

Ketangkasan perubaan, diri sendiri dan juga hasil kepada sistem pentadbiran baru juga penting bagi membolehkan staf dapat menerima sistem kerja pustakawan melalui kerja berpasukan yang kurang pengawasan dan dapat bekerja dengan baik melalui sikap percaya pada setiap staf bagi kelancaran sistem pentadbiran yang baru.

KESIMPULAN

Kita tidak boleh menolak teknologi tetapi perlu seiring dengan teknologi dan begitu juga dengan dunia pustakawan dalam konteks memberikan perkhidmatan dan kemudahan terbaik di mana pandamik COVID-19 telah membuka lembaran baru kepada dunia kepustakawanan apabila sistem pentadibiran PUM bertukar corak dari bersemuka tradisoinal kepada penggunaan media sosial, google meet, webinar, zoom, Microsoft team dan sebagainya.

Ketangkasan pembelajaran adalah penting dalam memastikan Bahagian Pentadbiran yang terdiri daripada beberapa unit akan terus beroperasi dengan baik dan lancar. Walaupun keadaan pandemik COVID-19 melanda dunia namun peranan pustakawan

untuk pembangunan PUM perlu ditingkatkan dan bukannya penghalang untuk PUM terus maju kehadapan.

Ia menjadi titik tolak kepada corak kefahaman pustakawan untuk menjadi pustakawan yang memerlukan ketangkasan pembelajaran (*Learning Agility)* untuk berubah dan akur kepada perubahan tanpa perlu menoleh kebelakang. Cabaran ini bukan sahaja dalam mendidik pengguna tetapi dalam semua skop tugas kita termasuk perkhidmatan, kemudahan, rujukan, perolehan, pengkatalogan dan sebagainya.

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Mapping the Knowledge Domains of Research Data Management: A Co-occurrence Analysis

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ABSTRACT
This paper provides a knowledge presentation and mapping of research data management (RDM) based on a bibliometric analysis of the subject. The study investigates the keywords co-occurrences network and develops clusters to find the main themes from RDM publications in Scopus between 1977 and 2021, to uncover RDM development and identify the potential field of research on RDM. VOSviewer is used for constructing and visualising the data, while Microsoft Excel is used for analysing and presenting the descriptive statistics. The study focuses on searching the author and index keywords of "research data management" in the Scopus database to identify the RDM publications. The data gathered covers publication from 1977 to 2021, in which from 2012 onwards the publications produced were over ten documents per year. The study identified 442 documents with different languages and reference types. The study found four research clusters developed from 442 documents that present multiple themes derived from a specific paper related to the RDM. The main four themes identified are: RDM services, data sharing, information systems, and data management. The study also provides suggestions for potential research directions according to each RDM cluster. Findings from this paper highlights how RDM related research grows over time. This paper also contributes to the understanding of the underlying structure of RDM in addition to highlighting the important input towards the development of the RDM in scientific research.

Keywords: Mapping knowledge domains, Research data management, Information services; Data sharing; RDM services; Bibliometrics

INTRODUCTION

Research data management (RDM), which is part of the research process, has become widely discussed in many empirical works within this decade. RDM, which concerns the organisation of data, from its entry to the research cycle through to the dissemination and archiving of valuable results, is important to its stakeholders which include (i) government & funders, (ii) university leadership, (iii) research management/support units, and (iv) researchers (Flores et al. 2015). There are different drivers and influencing factors on how RDM services could be created. The perspectives of RDM could be derived from different components related to strategies, policies, guidelines, processes,

technologies and services (Pinfield, Cox, and Smith 2014), and the development of RDM would be interrelated between the stakeholders, drivers and influencing factors.

There has been rapidly growing discussions on RDM in various scholarly platforms, and it has been a popular research topic in the library and information science (LIS) literature. Several studies systematically review and bibliometrically analyse RDM literature, but they are limited to certain areas. Perrier et al. (2017) conducted the scoping review on RDM in academic institutions, covering 301 articles published from 1995 to 2016. The study found that 85% of articles were published from 2010 onwards. The articles were grouped into five areas: stakeholder, data, library, tool/device, publication, and data quality. Ashiq et al. (2020) covered RDM literature published between 2016 and 2020, and the study focused on the challenges, services, skills, and factors on RDM practices by researchers and services by academic libraries. Zhang & Eichmann-Kalwara (2019) studied the RDM literature in the Scopus database, applying bibliometric analysis and data visualisation using CiteSpace. Using various keywords as search strategies, such as "research data management" and areas related to RDM such as digital curation, data steward, data curation, data management plan, the retrieved documents were published between 1945 and 2018. The study found six RDM themes: scientific collaboration, research support service, data literacy, knowledge manager, organisational environment, information literacy and particular matter. Zhang & Eichmann-Kalwara (2019), conducted a bibliometric study on RDM, and found major research clusters within this interdisciplinary field which include “scientific collaboration,” “research support service,” and “data literacy”. Additionally, there was a sharp increase in several LIS specific topics, such as “digital library”, “big data”, “data sharing” and “data curation”. However, there is still limited profiling of RDM literature in terms of knowledge structure, to gauge the trends, and future research focus.

This study investigates the keywords co-occurrences network analysis and applying knowledge domains mapping by developing clusters from RDM publications. The keywords co-occurrence network is a valuable tool for identifying research areas (Liu and Mei 2016). The mapping knowledge domains aimed to describe a newly evolving interdisciplinary area of knowledge while looking at the process of mining, analysing, sorting, enabling navigation of, and displaying knowledge (Shiffrin and Borner 2004). Mapping knowledge domains could also be called knowledge graph or knowledge visualisation as part of social network analysis (Zhu et al. 2015). This analysis could reveal that the hidden connections between the publications and the mapping knowledge domains cannot be easily interpreted if doing manually (Li et al., 2017). Therefore, this study could present the mapping knowledge domains as an approach of scientific literature on RDM by focusing on the following research question; “How can the relationships among research data management literature be described and analysed in a representative, dynamic, and scalable way?”.

MATERIALS AND METHOD

The data for this study was generated from Elsevier’s Scopus database as of April 2021. Scopus has been chosen because it one of the largest citation databases of peer-reviewed literature, with strength in inter-disciplinary feature, the nature of RDM as a research field (Zhang & Eichmann-Kalwara 2019). Scopus covered many types of research publications

with ensuring the quality of data indexed through the meticulous data selection and re-evaluation by the Scopus Content Selection and Advisory Board (Baas et al. 2020). According to Baas et al. (2020) and Martín-Martín et al. (2021), the Scopus database has more than 27 million publication records (1966-2004), and it has grown up to over 76 million publication records which covering publications from 1788 until 2019. The Scopus database contained different publications covering the global coverage of journals, conference proceedings, books, and others (Baas et al. 2020). Therefore, the research community has recognised the Scopus database as the main relevant database, providing a comprehensive overview of the research outputs (Wahid, Ahmi, and Alam 2020).

Social network analysis, a technique in identifying the clusters of related nodes within the network (Benckendorff and Zehrer 2013) was used as the research approach. This network was analysed using cluster analysis, centrality, betweenness, and any relevant metrics; when all analysis combined, they contributed the overview of the knowledge domains. This analysis could permit the analysis of the relationship and collaboration development in the research area.

The keyword "research data management" contained in the title, abstract, and keywords fields were used to search the relevant publications in the Scopus database. The exact keyword "research data management" in the keyword searching was used as an additional query to retrieve specific publications focusing on RDM. The query search keyword in the Scopus database covers all publication years, languages, source types, and document types. The search was conducted on 28th April 2021. Figure 1 presents the literature search flow used in this study. All the publications found were analysed using two application tools; (i) VOSviewer version 1.6.16 to generate and visualise the bibliometric networks and mapping analysis such as keywords and citation co-occurrence networks; (ii) Microsoft Excel to retrieve the frequencies and percentage of publications and to develop graphs/tables.

Data were retrieved straightly from the Scopus database using two types of export data; (i) RIS and (ii) CSV. The data was analysed from these two types of export data according to applications such as RIS for VOSviewer and CSV for Microsoft Excel. This study developed the clusters from the 442 RDM publications retrieved using the mapping knowledge domains analysis method.

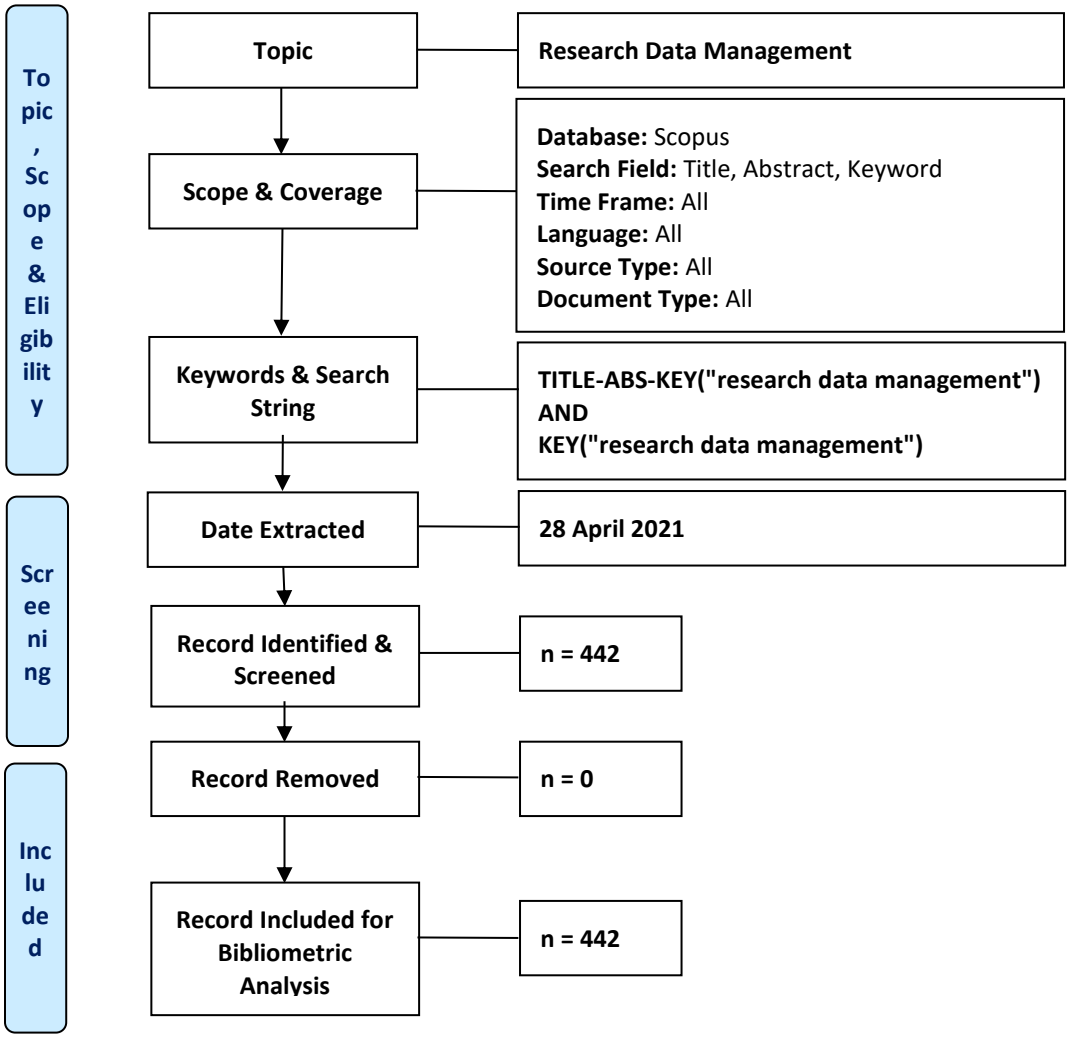

Figure 1: Literature Search Flow for this Study

RESULTS

RDM Topics

A total number of 442 publications were identified in the Scopus database based on the keyword "research data management". A total of 160 keywords were identified, which consist of both author keywords and index keywords. All these keywords have a total of 2552 times appearing in 442 publications. The study found issues for similar keywords but differ by the singular and plural terms such as "Research Data Management" and "Research Data Managements", where for proper noun the singular term is preferred, and plural term is used for the common noun. Some keywords also have the same meaning or connotation but in different terms or spelling, such as "Fair" and "Fair Principles". Therefore, this study combined some keywords, which become a unique keyword using the thesaurus method in VOSviewer to get accurate results. As a result, the study found 145 keywords after the cleaning process and used them as descriptors to identify the subject of the publication. Table 1 shows the top 20 keywords from the total keywords in 442 publications. Each publication may have one or more than one keyword

to it. The most appeared keyword is obviously the general term "Research Data Management", "Information Management" and "Research Data'. "Libraries" appears 4th in the list of top keywords used. Other keywords used are associated with concepts and areas in the management and delivery of digital content – "Metadata", "Data Repository", "Data Sharing", "Data Curation", "Digital Storage" and "Information Services". RDM is also associated with openness and transparency, reflected through the keywords used such as "Open Science", "Open Data", "Open Access" and "Reproducibility".

Table 1: Top 20 keywords from 145 keywords in 442 publications

	Keywords	Total number of appearing in publications
1	Research Data Management	576
2	Information Management	230
3	Research Data	85
4	Libraries	79
5	Metadata	59
6	Open Science	47
7	Data Repository	45
8	Data Sharing	41
9	Data Curation	39
10	Open Data	33
11	Digital Libraries	32
12	Digital Storage	27
13	Information Systems	27
14	Information Services	26
15	Open Access	26
16	Big Data	25
17	Semantics	22
18	Reproducibility	22
19	FAIR Principles	21
20	Research	21

** The total number of appearing in publications for each keyword could be more than the actual number after merging some keywords.*

RDM Research Areas

Research area or clusters based on the 145 keywords found from RDM publications were identified. The cluster had been developed with the 10 minimum number of occurrences of keywords and excluded the keywords with low occurrences. Based on this threshold, 57 keywords were selected from this process and visualized based on their respective clusters using VOSviewer. Figure 2 shows the network visualisation of the keywords co-occurrence network in which the circle size, font size, colour, and the thickness of the connecting lines indicate the link strength of the relationship between keywords. The network indicates that the related keywords by the same colour as commonly listed together. Four clusters emerged from the keywords co-occurrences network, namely

"RDM services" (Cluster 1, red, 16 keywords); "Data sharing" (Cluster 2, dark green, 15 keywords); "Information systems" (Cluster 3, blue, 14 keywords) and "Data management" (Cluster 4, light green, 12 keywords).

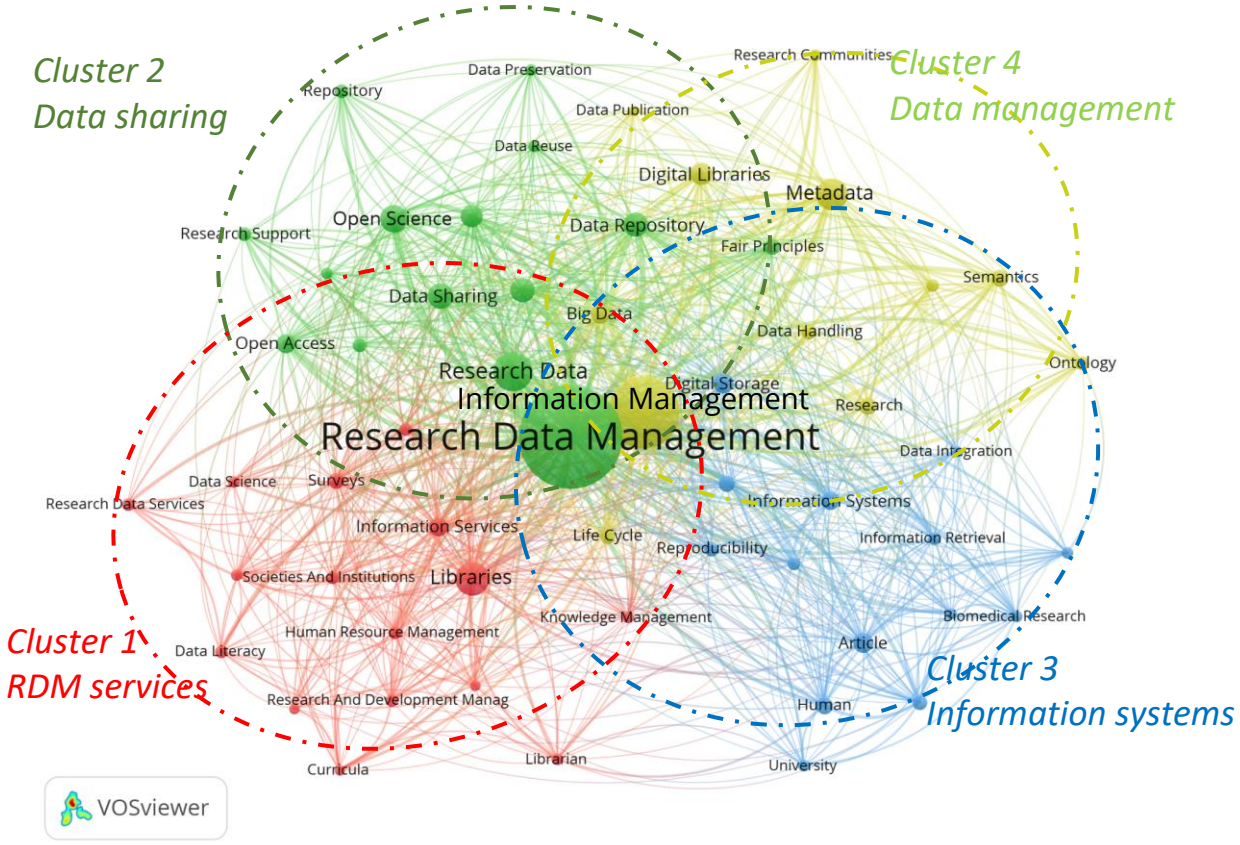

Figure 2: Keywords co-occurrence network

All keywords, showing the full counting of the occurrences, indicate the total number of occurrences of a term in all publications (Van Eck and Waltman 2020). Each theme has keywords that occur in its cluster, and they were sorted first by cluster and then by total link strength (Appendix). The total link strength is referred to the number of publications in which two or more keywords occur together (Van Eck and Waltman 2020). The keyword "Libraries" is the most common occurrence (4%) with the highest total link strength (3.35%) in RDM services (Cluster 1). Overall, "Libraries" is at fourth place for the total occurrences and fifth place for total link strength among the keywords. The primary keyword "Research Data Management", is placed in Data sharing (Cluster 2). It has the highest occurrence (421, 23%) and the highest total link strength (1345, 17.35%). The highest occurrence in Information systems (Cluster 3) is "Digital Storage" and "Article" respectively (27, 1%). "Information Management" is the highest occurrence (230, 13%) in Data management (Cluster 4) and is the second-highest occurrence overall. Findings show that only "Research Data Management" and "Information Management" have more than 200 occurrences with more than 900 total link strength. However, these two keywords are not positioned in only one cluster. All other keywords have below 100 occurrences. It

is worth mentioning that some keywords although were low in occurrences, but were high in total link strength around the keywords co-occurrences network. For example, some keywords were between 18 and 32 occurrences, but the total link strength was between 100 and 151, such as “Information Services” (Cluster 1), “Digital Libraries” (Cluster 4), “Digital Storage” (Cluster 3), “Article” (Cluster 3), “Surveys” (Cluster 1), “Human” (Cluster 3), “Big Data” (Cluster 4), “Open Access” (Cluster 2), “Information Systems” (Cluster 3), “Semantics” (Cluster 4) and “Information Processing” (Cluster 3) (see Appendix).

RDM publications associated with the keyword “Research Data Management” becomes the biggest node in the keywords co-occurrence network (Figure 2 and 3). Figure 3 shows the average publication year of the publications in which a keyword or a term occurs or the average publication year of the publications published by a source, an author, an organisation, or a country (Van Eck and Waltman 2020). Most publications have the publication year from 2017 onwards, specifically in RDM services (Cluster 1) and Data sharing (Cluster 2), indicating many keywords (shown in yellow, orange and red). Specifically, Cluster 2 falls under the theme of Data Sharing, indicating the most recent keywords occurred in recent publications from 2018 onwards (red). The keywords related to “Data Repository”, "Open Science", "Open Data", "Data Sharing", “Data Reuse” and “FAIR Principles” were indicated as the big nodes and red colour in Data sharing (Cluster 2) from this co-occurrence network. While the keyword "Libraries" was indicated as the biggest node and red colour in Cluster 1 under the theme of RDM services. Overall, there were many keywords with red colours in Data sharing (Cluster 2).

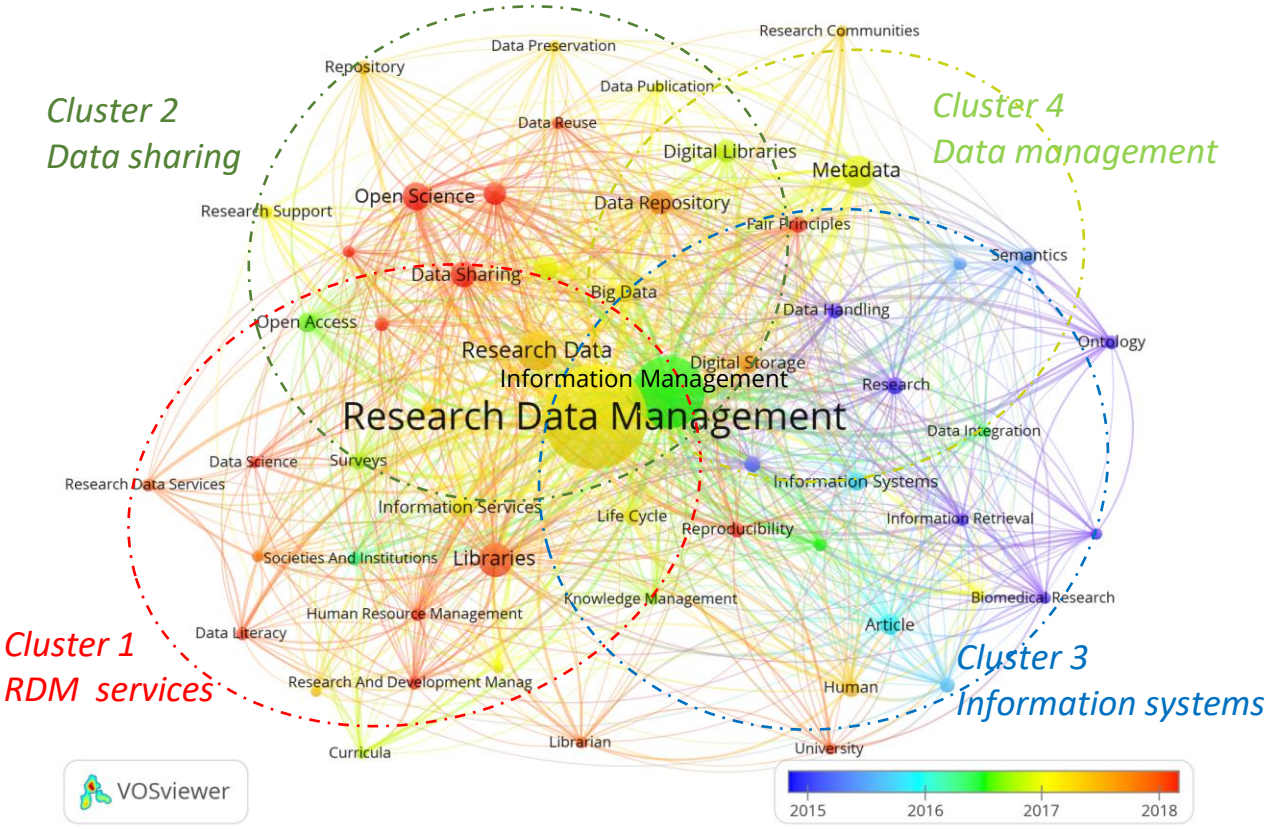

Figure 3: Keywords co-occurrence network by year of publications

Figure 4 presents the number of RDM publications from 1977 to 2021 (April 2021) based on the research areas/clusters. Each cluster has a different number of publications - RDM services (Cluster 1, 149), Data sharing (Cluster 2, 424), Information systems (Cluster 3, 118) and Data management (Cluster 4, 264). The study indicates that most publications were published in Data Sharing (Cluster 2) among the other clusters. There were not more than three publications for each cluster from 1977 to 2011. However, it is noticeable that there was a spectacular increase in most publications from 2012 onwards. Data Sharing (Cluster 2) shows an increase from 12 publications in 2012 to more than 70 publications in 2019. Data management (Cluster 4) was second of the most increasing RDM publications, from 8 publications in 2012 to 41 publications in 2018 and 2019. Overall, each cluster shows between 13% to 18% of total publications between 2017 and 2020. Most publications were gradually published between these four years, and it is still continually increasing. However, the number of publications in 2021 was not completed yet because this study was conducted in April 2021. All these numbers will be reflecting the growing interest in RDM, especially in relation to Data sharing (Cluster 2) and Data management (Cluster 4).

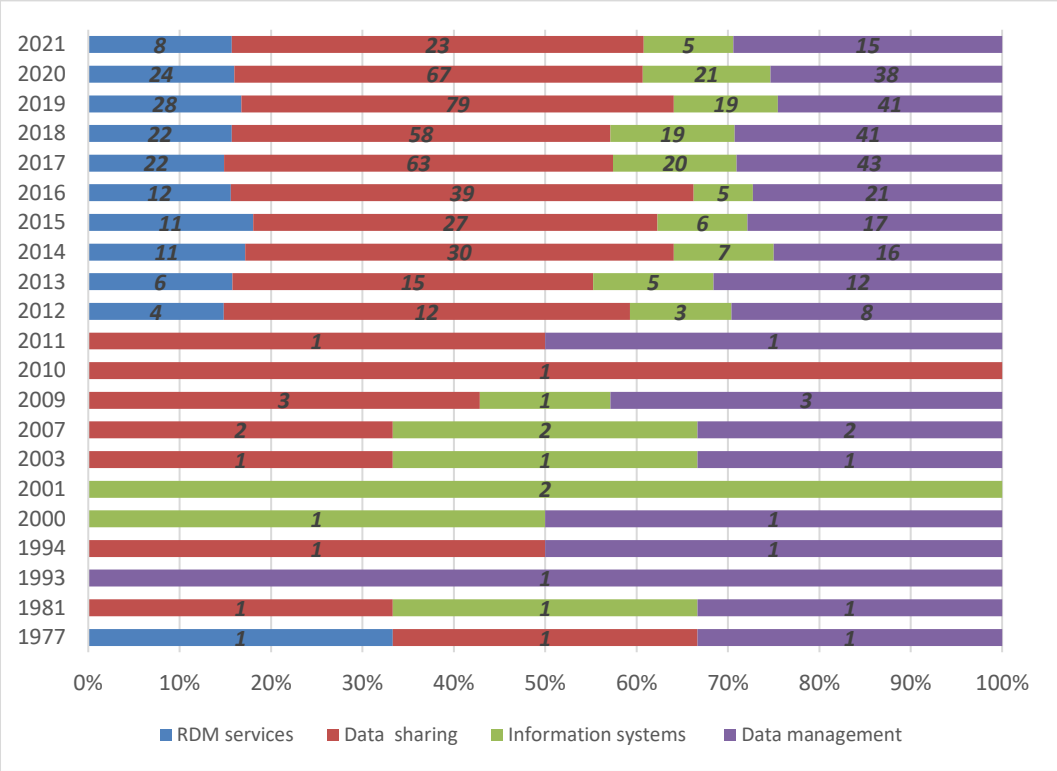

Figure 4: Number of RDM publications by years and clusters

RDM Subject Areas

This study categorised the subject areas according to the publications in each cluster, as presented in Table 2. The subject areas are referring to the Scopus database, and there are 26 subject areas with additional general subject areas containing multidisciplinary journals; (i) Life Sciences; (ii) Physical Sciences; (iii) Social Sciences and (iv) Health Sciences (García, Rodriguez-Sánchez, and Fdez-Valdivia 2011). Table 2 shows that RDM as a topic shares with a variety of subject areas. Because some publications would have more than one subject area, data in Table 2 presents more than the actual total number of publications. The cluster that has the highest number of publications covering the subject areas is Data sharing (Cluster 2, 660), followed by Data management (Cluster 4, 433), RDM services (Cluster 1, 220) and Information systems (Cluster 3, 209). Computer Science and Social Sciences are the two highly represented subject areas in RDM publications. The subject area Computer Science has the most number of publications in each cluster (more than 50% of total publications) - RDM services (Cluster 1, 53.69%), Data sharing (Cluster 2, 58.96%), Information systems (Cluster 3, 63.56%) and Data management (Cluster 4, 79.92%). Social Sciences represents more than 40 percent of total publications in RDM services (Cluster 1, 54.36%) and RDM sharing (Cluster 2, 44.58%). It was clear that the subject area of Computer Science and Social Sciences has been dominant in RDM services (Cluster 1) and Data sharing (Cluster 2).

Table 2: RDM Subject areas

Subject Area	**Total Publications (TP)**			
	Cluster 1 RDM SERVICES	**Cluster 2 DATA SHARING**	**Cluster 3 INFORMATION SYSTEMS**	**Cluster 4 DATA MANAGEMENT**
Agricultural and Biological Sciences	1 (0.67 %)	4 (0.94 %)	3 (2.54 %)	2 (0.76 %)
Arts and Humanities	3 (2.01 %)	14 (3.03 %)	2 (1.69 %)	6 (2.27 %)
Biochemistry, Genetics and Molecular Biology	1 (0.67 %)	11 (2.59 %)	8 (6.78 %)	8 (3.03 %)
Business, Management and Accounting	2 (1.34 %)	8 (1.89 %)	-	3 (1.14 %)
Chemical Engineering	1 (0.67 %)	3 (0.71 %)	1 (0.85 %)	2 (0.76 %)
Chemistry	4 (2.68 %)	7 (1.65 %)	3 (2.54 %)	6 (2.27 %)
Computer Science	**80 (53.69 %)**	**250 (58.96 %)**	**75 (63.56 %)**	**211 (79.92 %)**
Decision Sciences	5 (3.36 %)	22 (5.19 %)	7 (5.93 %)	18 (6.82 %)
Dentistry	-	1 (0.24 %)	-	-
Earth and Planetary Sciences	1 (0.67 %)	8 (1.89 %)	1 (0.85 %)	5 (1.89 %)
Economics, Econometrics and Finance	1 (0.67 %)	3 (0.71 %)	-	-
Energy	-	2 (0.47 %)	1 (0.85 %)	1 (0.38 %)
Engineering	8 (5.37 %)	24 (5.66 %)	11 (9.32 %)	19 (7.20 %)
Environmental Science	1 (0.67 %)	6 (1.42 %)	5 (4.24 %)	6 (2.27 %)
Health Professions	5 (3.36 %)	8 (1.89 %)	9 (7.63 %)	8 (3.03 %)
Mathematics	12 (8.05 %)	62 (14.62 %)	19 (16.10 %)	61 (23.11 %)
Medicine	9 (6.04 %)	29 (6.84 %)	27 (22.88 %)	19 (7.20 %)
Multidisciplinary	1 (0.67 %)	1 (0.24 %)	1 (0.85 %)	1 (0.38 %)
Neuroscience	1 (0.67 %)	4 (0.94 %)	4 (3.39 %)	1 (0.38 %)
Nursing	-	-	1 (0.85 %)	-
Pharmacology, Toxicology and Pharmaceutics	1 (0.67 %)	2 (0.47 %)	1 (0.85 %)	1 (0.38 %)
Physics and Astronomy	1 (0.67 %)	1 (0.24 %)	-	1 (0.38 %)
Psychology	1 (0.67 %)	1 (0.24 %)	1 (0.85 %)	1 (0.38 %)
Social Sciences	**81 (54.36 %)**	**189 (44.58 %)**	**29 (24.58 %)**	**53 (20.08 %)**
Total	**220**	**660**	**209**	**433**

DISCUSSIONS

This study aims to identify the main themes from RDM publications and the potential field of research on RDM, examining the relationship among RDM publications through mapping of knowledge domains analysis. This study has developed the themes from the publications related to the RDM using the primary keyword “Research Data Management”. It has applied the bibliometric approach to evaluate research productivity (Moed, Luwel, and Nederhof 2001). Bibliometric studies have been growing to reveal this study's statistics and literature growth (Ahmi and Mohd Nasir 2019). Indeed, there were limited bibliometric studies related to the topic of RDM that have been published.

This section discusses the findings from the bibliometric analysis above by revisiting the research question in this study. The selection of publications from Scopus databases was based on the primary keyword “Research Data Management”. VOSviewer was used for data analysis to extract the main themes related to the RDM publication by emerging the

four clusters. This study summarised the four clusters represented by the four main themes: RDM Services, Data Sharing, Information Systems, and Data Management.

Cluster 1: RDM Services

The first cluster was represented by keywords oriented in the topics around RDM services. The current library services have been changed rapidly because of the various materials and formats available online and offline. Indeed, the research data could be in various types of materials and formats involved by the library in determining the new library services, especially related to the RDM. Therefore, the co-occurrences analysis shows that most publications discussed the library, information services, data literacy, and institutional repository, indicating higher frequencies from this analysis. The library has to play the roles of RDM because of the reliable capability and expertise of RDM in the range of skills and knowledge (Avuglah and Underwood 2019). The library has been accustomed to coordinate the RDM services, especially in advocacy and giving training on RDM to the researchers. In addition, the librarian can handle the RDM services, who are well experienced in library services such as information services, knowledge management, institutional repository and reference services. Most library services could be related to the RDM services, such as creating the metadata of research data in institutional repository and information services in advocating the researchers through training and consultation services and others. Indeed, the library could increase the awareness of RDM by advocacy program and conduct training and workshops (Marlina and Purwandari 2019; Wiorogórska, Leśniewski, and Rozkosz 2018; Wiljes and Cimiano 2019; Y. Li, Dressel, and Hersey 2019). Many publications also mentioned that the library had been played the primary roles in developing and delivering the RDM services to the researchers (Bunkar and Bhatt 2020; Nitecki and Davis 2019; Harrison 2018; Mushi et al. 2020; Henderson and Knott 2015; Tammaro et al. 2019; Chawinga and Zinn 2020; Hickson et al. 2016; Koltay 2016a; 2016b; Cox and Pinfield 2014; Pinfield, Cox, and Smith 2014)

Cluster 2: Data Sharing

The second cluster was closely related to the keywords co-occurrences related to data sharing issues. The primary keyword “Research Data Management” has been placed in this cluster. According to Zhu et al. (2015), the highest frequency keywords showed high concentration and focused on a particular topic. This keyword demonstrates that it will help develop application research by emphasising the execution of the research findings. It occurs in this cluster when the primary keyword of this study has been placed with other important keywords, which are oriented around data sharing such as “Research Data”, “Open Science”, “Data Sharing”, “Data Curation”, “Open Data” And “FAIR Principles”. The importance of RDM for researchers and supporting research units is growing in the context of the open science movement (Vilar and Zabukovec 2019). Data sharing is one of the main aspects of open science that promotes excellent managing of the research data as it is a prerequisite of open science and RDM policies (Timmermann 2019). Open data could be considered particularly important for achieving the open science agenda, with open data is frequently indicated to data sharing and data reuse (Mosconi et al. 2019). Therefore, comprehensive research support is needed for integrating the RDM and open science strategies (Rice 2019). The FAIR principles are also very important when the researchers are encouraged to have a greater engagement with RDM and openness.

Therefore, the FAIR principles have been introduced when data should be made as findable, accessible, interoperable, and reusable (Schöpfel et al. 2018). Most keywords in this cluster were closely related to each other and easy to understand the relationship among them.

Cluster 3: Information Systems

This cluster was related to the information systems issues in developing and implementing RDM. Generally, information systems are an integral element for collecting, storing, and processing data. The data is used to provide information and contribute to knowledge and digital products. Therefore, clinical and biomedical research was widely used as the information systems for managing the research data, which most research data has been digitised as the primary source of research in these fields (Tang et al. 2018). Digital storage was an essential part of the information systems which many institutions, especially medical institutions, providing the storage for research data (Suhr et al. 2020; Tang et al. 2018). The information systems in RDM involve data processing, integration and retrieval (Pinfield, Cox, and Smith 2014). Instead of the needed skills and knowledge in developing the RDM services, the technology infrastructure may also be another resource allocation for RDM, such as software and hardware to support the researchers regarding RDM activities (Aydinoglu, Dogan, and Taskin 2017). Lack of information and technology infrastructure becomes a challenge in providing the facilities to the researchers for storage, preservation, and open data to fulfil the institution's requirement, funders and publishers (Kruse and Thestrup 2014). The future aspects of RDM could be explored in research related to information systems and technology infrastructure issues that will be effective to development and activities on RDM.

Cluster 4: Data management

According to the results of this study, most RDM publications were under the subject area of Computer Sciences and Social Sciences, specifically in relation to the library and information science area. In other words, the RDM also could be under the topic related to information management. Basically, the components of RDM are intimately related to information management. The keywords in this cluster were oriented to the data management activities, such as metadata management. The metadata of research data may be different from research publications such as journal article. The creation of metadata for research data may need to researcher's contribution in describing its metadata while regularly the research publication’s metadata could be described accurately by the librarians. Certainly, metadata management is vital in the flexibility and efficiency of data management because the metadata could be accessible on data platforms or databases for the long-term preservation of research data (Finkel et al. 2020). However, many researchers have not used the standardised ontology or metadata schema, giving the library challenges in providing and creating semantically linked sources for research data (Schirrwagen et al. 2019). Research on data management should be focused on by the researchers involved in data handling, from creating the metadata until data publication throughout the research lifecycle. The researchers are critical to explore more aspects of RDM to fulfil personal needs, the requirements of institutions, funders and publishers.

Literature growth

The publications from the Scopus database were extracted for all years of publications in the Scopus database. The study found that there were publications with the keyword "research data management" from 1977 to the date of this study in April 2021. The analysis done was prominent when many publications on RDM have been started from 2012 and increasing until today. This growing of publications shows that the area of RDM is increasingly fascinating attention of the researchers to study more about the related issues of RDM. According to the analysis has been done by Zhang & Eichmann-Kalwara (2019), the study revealed that the top three clusters from the literature related to RDM were scientific collaboration, research support service and data literacy. This present study shows that the research support services and data literacy were part of RDM services (Cluster 1), which is in one cluster. The average publication years of data literacy as a cluster in Zhang & Eichmann-Kalwara (2019) study was 2010. However, the growth of the literature around RDM is increasing, and the present study indicates that data literacy is average from 2017 onwards. It is the same that occurred with other clusters. This study plainly demonstrates that the publications about RDM are growing, especially in Data sharing (Cluster 2), when the issues related to open science and data sharing. These issues are currently discussed in many works of literature as research on open data has proliferated since 2009 with the development of various initiatives (Zhang et al., 2018).

The study illustrates the results using keywords co-occurrence network analysis that could be utilised for classification. The classification shows the clusters that represent the co-occurrences that developed with easy to be interpreted. The various knowledge domains have been demonstrated using the VOSviewer as a primary tool for this study. The approach of this study was representative when the publications have chosen using the primary keyword "Research Data Management" with multidisciplinary and more expansive representations of views and opinions. This study also uses the analysis that allows the dynamic relationship among the RDM publications using the author and index keywords available in each publication. As a result, four clusters developed from this study show the dynamic relationship among numerous keywords even within different clusters. It can be demonstrated by analysing the link among the keywords and the calculation of total link strength. This study also used the scalable approach when the study examined the RDM publications for all years (1977-April 2021) with not limited to a specific period. This approach can analyse the relationship and trends of RDM publications in the Scopus database and obtain wide-ranging findings.

CONCLUSION

This study specifically focuses on developing the main themes of RDM publications from the Scopus database using bibliometric analysis. The publications were extracted for all years from 1977 to April 2021. The main themes found in this study indicated the keywords co-occurrences network and literature growth of RDM publications. The findings of this study covered the publications data obtained from the Scopus database only. Undeniable that the Scopus database is one of the largest databases, and there are unindexed journals related to RDM topics that might have been missed (Sweileh et al.

2017). The publications were obtained by searching the keyword "research data management" under the title and abstract, and this keyword was mandatory for keyword searching. Further study could be expanded by using specific keywords to focus on specific themes or fields related to the RDM.

This paper stands out from any other bibliometric study of RDM literature that has previously been published as it started with developing the clusters to identify the main themes based on the keywords co-occurrence network. Then, the bibliometric approach was used to answer the research question. Most RDM publications have focused mainly on subject areas of computer science and social science that were interrelated. However, most of them were explicitly focused on the area of library and information science. The issues on open science, data sharing and open data (Data sharing, Cluster 2) and libraries (RDM services, Cluster 1) were discussed in recent years and have been most published.

This study's findings could help researchers in the RDM field understand the current state of RDM publications and their issues discussed in the literature. This study also could help them to propose further research on related topics of RDM. The issues of RDM could be discussing more in the future due to the adoption of the RDM with current research consciousness, such as open science. Bibliometric approaches are used in this analysis to expand and complement previous studies on RDM literature. This study suggests more studies on RDM to be explored and discussed the related issues since the RDM still in the development and implementation process in many countries. Future research could obtain the attention of researchers and practitioners to contribute the knowledge of RDM and highlight the importance of RDM.

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APPENDIX

Appendix: List of keywords co-occurrences with total link strength by cluster

Keyword	Occurrences	%	Total link strength	%	Cluster
Libraries	65	4%	260	3.35%	***Cluster 1 (RDM services)***
Information Services	26	1%	151	1.95%	
Surveys	20	1%	126	1.63%	
Data Literacy	14	1%	52	0.67%	
Institutional Repository	13	1%	76	0.98%	
Societies And Institutions	13	1%	75	0.97%	
Human Resource Management	13	1%	73	0.94%	
Research And Development Management	13	1%	73	0.94%	
Research Data Services	13	1%	41	0.53%	
Librarians	12	1%	54	0.70%	
Students	11	1%	65	0.84%	
Knowledge Management	11	1%	60	0.77%	
Data Science	11	1%	46	0.59%	
Curricula	10	1%	58	0.75%	
Education	10	1%	54	0.70%	
Training	10	1%	42	0.54%	
Research Data Management	421	23%	1345	17.35 %	***Cluster 2 (Data sharing)***
Research Data	85	5%	383	4.94%	
Open Science	47	3%	192	2.48%	
Data Sharing	41	2%	167	2.15%	
Data Curation	39	2%	158	2.04%	
Data Repository	38	2%	177	2.28%	
Open Data	33	2%	162	2.09%	
Open Access	26	1%	112	1.45%	
Fair Principles	20	1%	80	1.03%	
Repository	16	1%	57	0.74%	
Research Support	16	1%	56	0.72%	
Scholarly Communication	15	1%	59	0.76%	
Data Management Plan	12	1%	53	0.68%	
Data Preservation	12	1%	43	0.55%	
Data Reuse	11	1%	52	0.67%	
Digital Storage	27	1%	140	1.81%	***Cluster 3 (Information systems)***
Articles	27	1%	131	1.69%	
Human	22	1%	120	1.55%	

Information Systems	24	1%	120	1.42%	
Data Management	20	1%	88	1.14%	
Information Processing	18	1%	100	1.29%	
Reproducibility	17	1%	77	0.99%	
Information Use	14	1%	75	0.97%	
Information Retrieval	13	1%	71	0.92%	
Biomedical Research	12	1%	84	1.08%	
Clinical Research	11	1%	55	0.71%	
University	11	1%	50	0.65%	
Software	10	1%	61	0.79%	
Data Integration	10	1%	52	0.67%	
Information Management	230	13%	976	12.59 %	***Cluster 4 (Data management)***
Metadata	59	3%	262	3.38%	
Digital Libraries	32	2%	147	1.90%	
Big Data	25	1%	114	1.47%	
Semantics	22	1%	106	1.37%	
Research	21	1%	98	1.26%	
Life Cycle	17	1%	90	1.16%	
Data Handling	17	1%	80	1.03%	
Ontology	16	1%	85	1.10%	
Linked Data	14	1%	83	1.07%	
Research Communities	12	1%	44	0.57%	
Data Publication	10	1%	49	0.63%	

Online Learning During COVID-19 Pandemic: A Survey of LIS Students in Yogyakarta

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ABSTRACT
LIS education in Indonesia was affected by the emergence of COVID-19 pandemic in the middle of March 2020. Face to face classes have shifted towards online educational platforms. This sudden change has caused students and lecturers to adjust their learning approach. Various challenges have emerged due to this change. This is a quantitative study conducted by distributing online questionnaires using google form. The aim of this study is to investigate how students respond to this pandemic situation and their learning experiences particularly in attending the online classes. The results of this study indicate that due to the COVID-19 pandemic, face-to-face classrooms and laboratory activities, including physical library visits, have been halted. Thus, students are required to adjust and make changes on their academic schedule. Students express their concern in studying online due to an unfavourable learning environment at home caused by noise from the conversation among the family members, traffic nearby, and others. Other factors include interruption by people like starting conversations or asking questions to the students during online class due to not knowing the students were attending online class. This happens often especially in the early days when the online classes started. The Internet is also another barrier for some students as they live in the suburbs or rural areas with poor Internet connection. As such, the students sometimes need to find places with better Internet access, such as a café or a library. In addition, the noises have caused inconvenience towards their studies as a result of them paying less attention in classes. The students have hoped to have blended learning with a mixture of both on campus classes as well as online classes.

Keywords: Pandemic, COVID-19, Library and Information Science education, Graduate LIS students; Indonesia.

INTRODUCTION

The year of 2020 was the toughest year for sectors of business, industries, tourism, education and many others. This condition was caused by the unprecedented COVID-19 pandemic that hit most countries in the world including Indonesia. The COVID-19 pandemic resulted in a world health and economic crisis that occurred in 215 countries. Many people have lost their lives. According to Worldometers, more than 3 million people died up to now (data of 21 April 2021). Meanwhile, the pandemic has caused companies to be in debt or closed their business, and many people lost their jobs.

According to Worldometers, The US has the highest number of Coronavirus Cases (147,794,679), and quite recently India has increased a lot in the number of cases and now India reached 32,824,389 cases and the new cases is over 349.591 in a day. Brazil is on the third place with 14,340,787 Cases. Meanwhile Indonesia currently reached 1,662,868 cases (data of 29/04/2021).

As we all know, COVID-19 emerged in China in the end of 2019 and early in 2020 and the virus has rapidly spread all over the globe until finally the United Nations stated the situation as pandemic. Governments around the world have been taking various actions to cope with it. Indeed, the situation has affected most aspects of life—personally, institutionally, nationally, and internationally. The education sector is one of the many that has been affected by the situation and resulted in the closing of schools and universities for face-to-face activities.

The pandemic has disrupted the daily teaching and learning activities from elementary schools to universities. As we can see, most schools and universities cancelled all classroom activities and turned to online classes soon after the situation got worsen. This condition affected students, teachers or faculty, librarians, and other staff of the educational institutions socially and psychologically. For the developed countries and the countries that have applied online classes before the pandemic, there surely is no problem of adapting to online classes for both students and teachers. For the developing and underdeveloped countries, both students and their families are not always easy to cope with this sudden change. Some have to struggle to get facilities in order for their children to take part in the online classes and adapt to the new ways of learning using information technology tools. The shift from onsite to online, indeed, needs much effort from various parties—students, teaching staff, librarians, and all other staff, including administrative and laboratory staff, and even the gardeners and cleaning service employees.

The term 'online education' has actually been in existence in Indonesia for the last few decades, but this online education is considered not as effective as the onsite one. Therefore, most educational institutions emphasize face-to-face learning and the presence of people in the campus for the educational process. Online education is defined as a form of distance education that uses an internet connection as its learning method, with at least 80% of courses content posted online (Allen & Seaman, 2011; Shelton & Saltsman, 2005). It is separated by distance. Another term, 'distance education', is sometimes used and it means a management method in which students and teacher are physically separated. It can take advantage of a combination of technologies, including correspondence, audio, video, computers, and the Internet (Roffe, 2004). The COVID-19 pandemic really forces the educational institutions to move from onsite to online in order for the learning and teaching process to continue.

As we all know, in the beginning of COVID-19 outbreak, universities and schools anticipated the pandemic by stopping the onsite classes. Other activities such as conferences, seminars, guest lecturing, and thesis or dissertation defenses, were all cancelled.

According to United Nations Educational, Scientific, and Cultural Organization (UNESCO), more than 160 countries have implemented national school closures, affecting more than

half of the world's student population. In Indonesia all schools were closed. They then moved to online learning althouth most school had no experience at all. Meanwhile, more than 4,000 higher education institutions in Indonesia switched to online learning methods. It is also stated that more than 7 million students and 300,000 lecturers are currently holding online classes (Yarrow and Bhardwaj, 2020). In fact, the total number of universities in Indonesia is 4,741 universities, but unfortunately only 15-20 universities have implemented and experienced e-learning system (Larasati, 2019). Therefore, many universities did trial and errors with online classes using whatever information technology they had.

In general, the pandemic has surely caused various positive and negative impacts. The positive side is that air pollution, for example, has dropped a lot, especially during the lockdown; digitalization becomes unavoidable and faster to implement. The pandemic has also forced those who seldom or never used any information technology applications to learn and practice using it. Senior faculty members who usually taught face-to-face without any learning technological facilities have been forced to practice using it, if they do not want to be left behind. All administration activities that were earlier managed onsite changed into online. Indeed, digitalization finally has run faster than expected.

From the university's point of view, however, this situation has also been really not comfortable. Managing buildings and maintaining various other physical assets while they are not in use is a burden for the universities, especially small private universities that depend their budget on the students' enrolment.

The new students enrolling for the 2020-2021 academic year is another example of the negative impact of pandemic on students. They have never experienced the university life physically. They never know the atmosphere of classroom and the campus in general. They also never meet their classmates and faculty members directly. Instead, they stay at home and learn all classes online. This condition raises a question, how the students experience education that is totally different from their expectation as they are actually students, but they must study at home. Attending all classes, meeting classmates, and looking for resources for the assignments are all done through the screens of their laptops or desktops. Some even use only mobile phones to study online.
This paper tries to find out how online learning is conducted.

Indonesia: The population and Information and Communication Technology

Indonesia is a country with more than 17,000 islands in which the biggest include Sumatra, Borneo, Papua, Sulawesi, and Java. Currently the number of populations is 271.349.889 million (Gischa, 2020). The population is actually the fourth biggest in the world. Most population live in Java (55.94%) and therefore, Java is the most densely populated, although Java is actually just one third of the size of Sumatra Island. Other areas of Indonesia have less population, such as sumatra (21.73%), Sulawesi (7.43%), Borneo or Kalimantan (6.13%), Bali as Nusa Tenggara (5.57%), Papua (2.02%), and Maluku (1.17%).
The population of Indonesia consists mostly young people and the number of productive-age people are bigger than the older ones. According to Badan Pusat Statistk (BPS) (2021), the population can be categorized as follows (fig. 1):

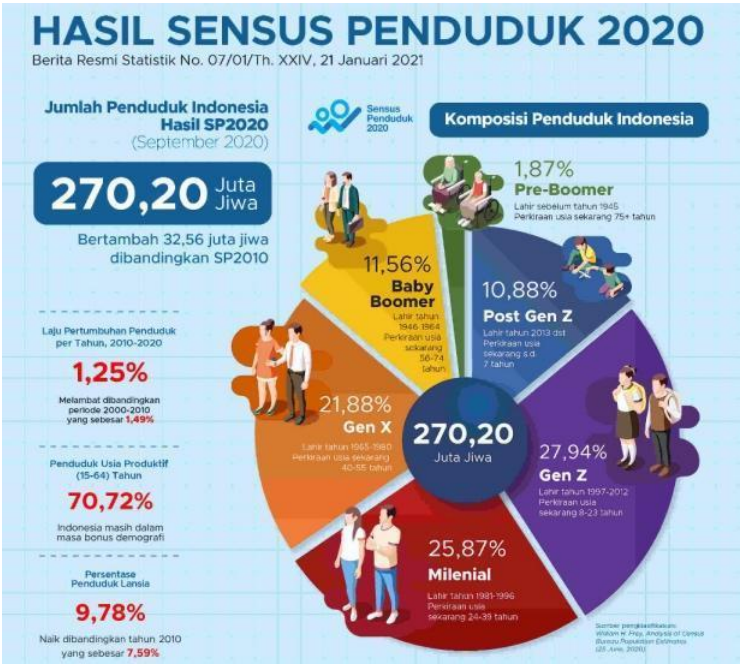

Fig. 1: Number of population of Indonesia. Source: Badan Pusat Statistk 2021. https://www.bps.go.id/website/images/Hasil-SP2020-ind.jpg

As seen from the above figure 1, the number of young generations—millennials, Gen Z, and alpha or post Gen Z (65.69%)—is higher than the older generation of Gen X and the older generation (34.31%). This actually means that many Indonesians are actually generations who live in the modern time where information technology has already been more advanced. Therefore, there are more Indonesians who are familiar with information technology. The decision makers, faculty, teachers, and some other professions, however, consists mostly of Gen X, and they are digital immigrants. In other words, in general people are more advanced in information technology than the decision makers. This may raise a gap in decision making relating to the use of information technology.

In Indonesia, the Internet speed is not as fast as the young generation expected. According to *We are Social*, the highest Internet speed is United Emirate Arab with 177.52 Mbps, followed by South Korea and China in the second and third level respectively (see fig. 2). In average, the Internet speed in Indonesia is 17.36 Mbps or about one tenth of the speed of Internet in United Arab Emirate. The speed of 17.36 Mbps is the average, but actually the highest speed of Internet in Indonesia is in Java and Sumatra, followed by Borneo, Bali, and Sulawesi. That is why often time some students in the eastern part of Indonesia cannot access the Internet better compared to those in the western part. However, although Java has the highest speed, actually that is also not well-distributed. Some areas in Java sometimes still have problem of Internet access.

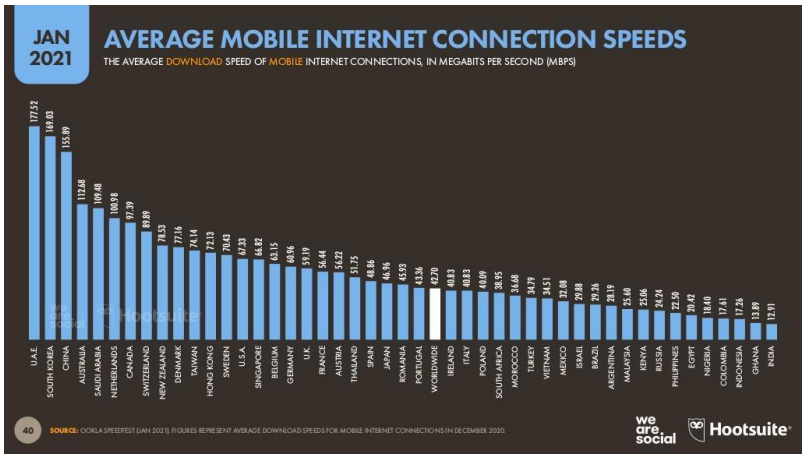

Fig. 2: Internet speed in the world. Data obtained from Hootsuite. Digital 2021: Global Overview Report — DataReportal – Global Digital Insights. https://wearesocial.com/digital-2021

Indonesian academic education before pandemic

Learning atmosphere during the normal condition before the pandemic of COVID-19 shows that it was always conducted in the classrooms. The face-to-face interaction between a lecturer and students did exist in the formal learning classes, and students usually waited for their time to ask or respond to their lecturer. During the class, students first listened to their lecturer and when the lecturer finished his or her teaching, students would be allowed to ask a question. As like other countries in Asia, the teaching and learning in Indonesia adopts that of Confucian heritage culture. In this culture, the lecturers are viewed as the most prominent, experienced, and trustworthy in the classroom (Yang, Badger, and Yu 2006), and therefore, students always respect their lecturers and value what the lecturers say to them. However, nowadays, in order to foster learning, lecturers usually create more interactive activities, such as group presentations, reviews and presentations. Students may also be asked to do a survey or visit, and the result is presented in the classroom. For the presentation, the lecturer usually invites other students to ask questions to the student who is presenting in the classroom. Group assignments enhance the students to interact with one another; while the question and answer during the presentation in the classroom make the classroom activities more interactive, although the lecturer is still the center of the classroom.

Library and Information Science in Indonesia

Priyanto (2016) stated that LIS education has now been more than 60 years long history. Library and information science (LIS) education in Indonesia has grown significantly since it was established and now the LIS schools have been available in some universities. The growth of LIS education is in line with the recent needs of the expertise of the graduates. Although LIS education has been in existence in the Indonesian education history for some

decades, the names of the department vary, and the organizational structures are under various schools or departments. “The Library and Information Department at the University of Indonesia was established in 1961” (Zen, 2009) in the form of vocational school and in 1964, it became an undergraduate program of LIS (Priyanto, 2016). This LIS program at University of Indonesia is considered as the oldest LIS program in Indonesia. LIS at University of Indonesia has graduated many students who then became librarians in various institutions. Other reputable LIS programs are Graduate school of Library and Information Management, Universitas Gadjah Mada, Department of Information and Library Studies, Padjadjaran University, Library and Information Science, Airlangga University, Library Studies, Diponegoro University, and Library Science at Brawijaya which are all located in big cities in the Java Island.

Currently there are 33 universities that offer LIS undergraduate study programs, while there are 4 graduate programs, namely Universitas Indonesia (UI), Padjajaran University (UNPAD), Universitas Gadjah Mada (UGM) and Sunan Kalijaga Islamic Public University (UINSUKA) in Yogyakarta. In other words, there are two LIS graduate schools in the State of Yogyakarta.

The State of Yogyakarta or the Special Region of Yogyakarta is located in the southern part of Central Java and in which the northern border is the province of Central Java, and the southern border is the Indian Ocean. Ruled by the Sultan of Yogyakarta, this region is the only officially recognized monarchy within the Indonesian government. At the city's center is the Sultan's palace called the Kraton. The city of Yogyakarta is a popular tourist destination and cultural center. It is also known as the center of classical Javanese fine art and culture such as batik, ballet, drama, music, poetry, and puppet show (wikipedia, 2021).

Yogyakarta is the home of more than 100 institutions of higher education. In addition, Yogyakarta is also known as “Kota Pelajar” (The city of students) and it is also the home of the first established state university in Indonesia, Gadjah Mada University (UGM).

In 1992, UGM opened the department of Library and Information Management (formerly Library Science) in the diploma level, but it was closed in 2005 because it lack faculty members. Meanwhile in 1996, UGM also founded Magister Perpustakaan (Master of Library Science) in the Faculty of Social and Political Sciences and in 2003, it changed its name to the Department of Library and Information Management. In 2007, this master’s program of Library and Information Management was moved from the faculty of social and political sciences to the Graduate School Office due to its interdisciplinarity. UGM only offers Master’s degree and is planning to open the doctorate program in the near future.

Meanwhile another university that offers master’s program in Library science is Sunan Kalijaga State Islamic University (UIN). This university offers both undergraduate and

postgraduate programs under the department of Islamic studies. Recently UIN opens for doctoral program in LIS under the same department.

Literature Review

A study by Dhawan (2020) shows that COVID-19 has made the growth of Educational Technology Start-ups. Meanwhile a study by Adedoyin and Soykan (2020) shows that pandemic has forced global lockdown of various activities including educational ones. The learning process in the educational institutions has shifted from onsite to online. According to Biwer at all, (2021) COVID-19 pandemic has caused students to face challenges especially in their different approach and adaptation to learning. Students missed personal contact with their lecturers and other students, and they have less collaboration and motivation. This study however, tried to find out how students of LIS education faced the pandemic of COVID-19, especially their learning experience.

Academic education during pandemic

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus and this is the fifth pandemic after the 1918 flu pandemic. Until now, the first reports and subsequent outbreaks of a cluster of new human pneumonia cases in Wuhan City, China, since the end of December 2019 (C. Huang, Y. Wang, X. Li, L. Ren, J. Zhao, Y. Hu, *et al*. 2020).

The COVID-19 pandemic in Indonesia is part of the ongoing worldwide pandemic of COVID-19 which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was confirmed that COVID-19 spread to Indonesia around 2 March 2020. By 9 April 2020, the pandemic had spread to all 34 provinces in the country. Jakarta, West Java, and East Java are the worst-hit provinces and the three provinces altogether account for more than half of the national total cases (*Jakarta Globe*,2020). As of 29 April 2021, Indonesia has reported 1,662,868 cases, with 45,334 deaths, Indonesia ranks 18th in the world (worldmeter, 2021).

Like the other sectors, education was also struck by the emergence of pandemic of COVID-19 in the middle of March 2020 in Indonesia. All universities had to stop their activities in the campuses and the universities shifted to online learning during the rest of 2020 and still continues this year. This sudden change has impacted on both faculty and students socially and psychologically. The students who began their study in the early 2020 found that they could not interact with their classmates and lecturers physically anymore. They had to accept the condition and changed their ways of learning and interaction. All lecturers could no longer go to the campus due to the closure of the universities. More painful was the students who started their study in the middle of 2020 and early 2021 as they have completely been studying online. The closures have made the Learning process, academic administration, and all educational communication has changed considerably since mid-March 2020. Classrooms that were usually full of students turned into empty

spaces. Classes changed, the students could study only at home, the lecturers no longer came to school or campus to deliver the material. The lecturers were simply at home or in a place where it is possible to give lectures to students. The main facilities of lecturers and students for their teaching and learning process were the learning technological media, in the forms of cellphones or computers/laptops, and data packages as the basis for internet networks.

Most universities now are still not opening their campuses yet and the learning and teaching activities are still held online now. However, they are considering the opening of classes, either partially or in a hybrid format.

Objective and Method

This study is aimed at understanding the students majoring in Library and Information Science (LIS) in Indonesia view the condition of online learning due to the pandemic of COVID-19; how they adapt to the situation; and what problems they face when they study completely online unlike their previous expectation.

This quantitative study on students' perception and expectation of online learning due to the pandemic of COVID-19 was conducted in the State of Yogyakarta where there were two (2) educational institutions, namely, UIN (Public Islamic University) Sunan Kalijaga and Universitas Gadjah Mada, that have LIS departments at the graduate level (Master's degree). The survey is designed through the Google form and in the form of questionnaires with multiple choice answers. To get better understanding, the questionnaire is also supported by open ended questions to accommodate additional information from the respondents. The questions are related to (1) difference of onsite and online learning experience according to students, (2) barriers of attending online, (3) interaction between students and lecturers and among students themselves, (4) students' perception of IT skills among lecturers, (5) expectation of students for future learning possibilities that are suitable and appropriate for both students and lecturers.

The survey was distributed on 29 March 2021 and was collected on 31 March 2021. The data were then analyzed manually. Active LIS students at both universities were contacted via whatsapp to ensure that they responded the invitation of the survey. The population of both universities is 50 students and 46 responded to the questionnaires. According to Krejcie and Morgan (1970) if the number of populations is 50 the sample should be at least 44, and so the number of samples was fulfilled.

RESULTS

Entering the academic year 2020 all of the classes were conducted online. Currently in Indonesia, many universities have to implement policies for teaching and learning activities from distance and online classes. This is actually not a problem for universities

that already have an online academic system. However, it will be a good lesson for universities that do not yet implement an online academic system. The result of the survey shows 46 responses from students who are fully studying online.

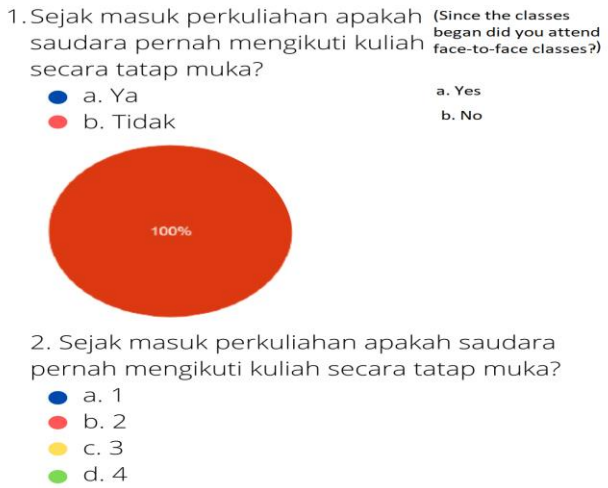

Fig. 3: Informants of the survey

A. **Online learning and obstacle**

The pandemic has changed the learning process that can be done online and conducted anywhere and at any time instead of being in the campus at certain schedules. Online learning not only is implemented in higher education institutions but also in pre-schools to high schools in Indonesia. It shows that entering the academic year of 2020-2021 all of the classes are conducted online for all new students. It means that the students have different views on today's learning. Thirty-one LIS students are more comfortable to attend the face-to-face classes rather than online, however 15 students enjoyed participating in the online classes, although they also prefer face-to-face classes. The students experience different ways of learning at this time. While students expect to attend classes in the campus, the situation is not conducive and look and feel very different. From the academic and library orientation to classes and exams, the programs are held online. Therefore, the students do not experience the physical campus life.

There are some obstacles that 44 out of 46 students experienced for the online classes during the pandemic. One of the factors is the unreliable internet connections. In Indonesia the speed of internet connection varied. Indonesian Internet Service Providers Association (APJII) has released report that Java has the highest speed, although it is not well-distributed. Some areas in Java sometimes still experience problems of Internet access. That is why, inequality of internet access is still one of the issues of online learning during pandemic. Sometimes students experience a problem of technological advances in which the laptop do not support the software for online learning. The disturbance from the surrounding environment and unconducive environment for learning are two other factors influencing the quality of online classes. Twenty-one students have jobs in some institutions and libraries, so they attend online classes while they are in the office or

libraries. The obstacles that often occur during the online classes include office work and the atmosphere that do not support their online class attendance.

B. **Interaction and communication**

The change in the learning process—from onsite to online—has an impact on various aspects, from the reduced intensity of interaction among students and interaction between students and lecturers; boredom due to the number of online classes; passive participation among students in the discussion during the online class.
The survey shows that noise is the most distracting problem during online classes. Indeed, the teaching and learning process will be more effective, productive, and interactive if there is no noise, but noise is often unavoidable. Noise refers to anything that interferes with the communication process between the lecturer and students. Noise can be external (physical sound) or internal (mental disturbance), and it may interfere with the communication process at any time during the class. The survey shows that there are 3 types of noises:

1. ***Physical Noise***

Physical noise is interference in our environments, such as noises made by other people, unconducive environment, vehicles sound, unavoidable sound of rain or thunderstorms, temperatures, and crowded conditions, and so on.

Some students who attend the online classes from home are sometimes distracted by the noise in their home such as a kid who is playing with other kids or another family member talk to one another, or even to the students themselves. Those students who attend the online class from the office are sometimes distracted by the conversation among other staff, a staff to the student, and other noise from any devices or natural environment (for example rain and thunder). This sort of noise does not only distract them; sometimes, when they open their microphone, other students who attend the online class also hear the sound or voice, and therefore, the noise distract the class too.

2. ***Physiological Noise***

Physiological noise is a barrier created from the communicator's physical condition. Physical illness and weakness may usually produce physical noise and this noise becomes a barrier to the effectiveness of the class communication. Apart from that sort of noise, online classes require students to be able to adapt to the use of digital technology. This increases the intensity of the use of laptops, computers, or other devices. The use of gadgets requires students to stare at the small screen longer than usual lectures and use a headset. Some students also mention that they spend hours on their laptops for their assignments besides attending classes and thus, indeed, it impacts on their health. According to the informants, they experience dizziness, headache, boredom, eye constrain, and other physical pain symptoms which is usually called *"cybersickness"* (Sherren**,** 2021).

3. *Semantic Noise*

Semantic noise is a communication barrier created from the confusion over the meaning of words. Semantic noise occurred because of the different meanings of the message between the sender and receiver (Kobiruzzaman, M. M. 2021).

Some students do not understand well about the material that is presented through online classes especially due to the noise resulted from the technological problem such as poor or unstable Internet connection, low bandwidth, etc. This technological noise leads to confusion or misinterpretation of the message. This can be a disadvantage for students, that impact on the level of students' understanding of the materials of the class.

C. **The role of technology and policy**

The COVID-19 pandemic has changed the educational life, with the dramatic change in the way the education is held. This can be seen for example, the classes are suddenly held online, the library offers online services, and administration is conducted online. Students cannot go to the campus physically due to the pandemic and this change the way students interact with other students and the lecturers. This raises the need of the institution to issue policies regarding the use of technology, for example, the applications, e-learning systems, and Internet bandwidth both for students, lecturers, and other staff in the academic institutions.

With regards to the future of education and the process of teaching and learning, students state that actually they prefer to study onsite so that they can interact with other students and lecturers face to face in the campus. However, they also mention that they have been familiar with the online classes, so they can accept the blended learning and adapt to academic life both online and offline. This idea is in line with a separate survey conducted by Gadjah Mada University.

In the survey conducted by UGM, most respondents (54.2%) apparently wanted Teaching and Learning Activities to be carried out in a blended learning model, namely a mixture of online and offline. Furthermore, blended teaching and learning activities are found to be the most comfortable to support the achievement of competencies and skills compared to the other two options, which is either online or offline according to the survey. Fifty-four point 2 per cent students choose blended learning, while 45.8 per cent respondents choose either online or offline classes, in which students who choose online classes reached 34.2%, while those who choose offline were only 11.6%

CONCLUSION

The COVID-19 pandemic has brought a significant impact on most sectors of life from family, social institutions, businesses, and industries, and also the education sector, especially the learning activities. The pandemic has disrupted the education process in

which students usually could study face to face with their lecturers, but they had to shift to online, therefore, both the students and lecturers need to adapt and adjust to the situation. Adjustment and adaptation to the next normal is unavoidable.

Most students actually still prefer to attend the offline classes because they find it easier to participate actively in the classrooms. They have no problem with access to faculty members if they are onsite (in the campus), but they cannot pay attention well when studying online due to the unsupportive physical environment. Regretly, students of the 2020-2021 enrolment have never experienced campus life since they became students for the first time.

With regards to the speed of internet connection in Indonesia, until now, the Internet access is good, but in some remote areas it is still slow and sometimes not stable depending on the region where the students access to the Internet. The online learning system still lack a clear and established policy regarding to the mechanism of online classes and teaching procedures. In addition, according to the students, some senior lecturers, who are from Baby Boomers generation, lack of technical skills in running the applications, especially the applications for online classes.

In the future, in post-COVID-19 pandemic, students expect to study both online and onsite (blended learning) so that they may experience both real campus and virtual life. Both onsite and online experience are necessary for students, as they are mostly digital natives who live in both virtual and real lives.

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Outreach and Engagement in the Time of a Pandemic: USM Library Experience

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ABSTRACT

The COVID-19 pandemic has been affecting the social and economic sectors worldwide, and higher education is no exception. The closure of the universities, campuses, and library buildings due to the nationwide Movement Control Order (MCO) imposed by the Malaysian Government in March 2020 has forced the librarians to modify and leverage online services and digital collections. This paper shares the experience of the USM library in response to the COVID-19 pandemic since early March 2020. It describes how the library communicates, provides access as well as explores new initiatives during the crisis. As an academic library of Research Universities in Malaysia, Universiti Sains Malaysia (USM) Library has implemented a hybrid approach method by providing both online and in-person services from the beginning. As a result, USM Library managed to respond, communicate, and reach out to the end-users via existing approaches and platforms rather than starting from scratch during the lockdown period. While access to in-person services is limited, other services such as document service delivery, research support, and electronic collections are available online. Furthermore, this global health crisis provides the opportunity for the librarians to evaluate, rethink and explore new initiatives to strengthen library services further and demonstrate their relevance to the user community.

Keywords: Academic libraries; Coronavirus; COVID-19; Pandemic and library services; User services; Remote library supports; Research support services; User services.

INTRODUCTION

COVID-19 in Malaysia & USM Library building shutdown

World Health Organization (WHO) (2021) on 11 March 2020 declared that the world is facing 'the first pandemic caused by a coronavirus' or COVID-19. As of 26 April 2021, there have been 146,841,882 confirmed cases of COVID-19 globally, including Malaysia.

Malaysia detected the first case of COVID-19 on 25 January 2020 involved three Chinese Nationals who previously had close contact with an infected person in Singapore (Elengoe, 2020). The number of cases in controlled and grew relatively slowly until a religious event gathering in Sri Petaling, Kuala Lumpur, which participated by 16,000 people worldwide. On 16 March 2020, 553 cases of positive COVID-19 had reported. Soon after that, the Malaysian Government announced a Movement Control Order (MCO) or 'Malaysian Quarantine' starting 18 March 2020 until 3rd May 2020 (Phase 1) and extended to 9 June 2020 (Phase 2). As of 17 June 2021, Malaysia still recorded high COVID-19 cases with 678,764 total positives cases, where 66,097 are hospitalized, 608,465 recovered, and 4,202 deaths (Flanders Trade, 2021). As the preventive measure to effectively control the COVID-19 situation, the Malaysian Government had imposed several phases of various MCO levels (Phase 1-Phase 6), ranging from high-risk areas to low-risk areas: Movement Control Order, Recovery MCO, and Conditional MCO, Enhanced MCO, and Targeted Enhanced MCO. To date, Malaysia currently had been put under MCO (Phase 6) since 21 May 2021.

After the announcement of MCO (Phase 1) by the Malaysian Government, Universiti Sains Malaysia (USM) had ordered the mandatory closure for all non-essential services included libraries. All staff was asked to work from home, and students had sent back to their homes. Soon after the order, the Top Management and Head of Divisions of USM Library had set up an immediate meeting to discuss the best efforts of providing library services and the strategies to be taken in supporting university teaching and learning during the lockdown period. Since access to the library buildings and physical collection is suspended, the meeting agreed that the Library might extend the circulation services and divert all users to the digital library services.

USM library had acted fast and decided that the most crucial plan during this unprecedented time is to ensure that we could communicate well with as many end-users as possible, continue supporting them, and offer more effective and innovative services. Therefore, this paper shares the outreach and engagement strategies taken by the USM Library in response to the coronavirus disease 2019 (COVID-19) outbreak.

COMMUNICATING WITH USM COMMUNITY

The immediate priority after the closure of the USM Library building was to communicate and update users about services provided during the MCO. To reach as many staff and students, USM Library used various communications tools, including Email, Website Notice, Social Media (Facebook and Instagram), and Live Chat services.

Email and Website

USM Library used email as the primary medium in promoting library information within the USM community for quite some time. Electronic mail systems allow the creation and transmission of messages sent to individuals or select groups of individuals. The recipient can then read the news, answer it, store it electronically, forward it to another individual, print a paper copy, or delete it. It is a great tool and an effective way to communicate with library users, especially during the critical stage (Wolfe, 2005). Besides the email, library

announcements and notices related to COVID-19 also accessible via Library Website. The information about MCO services will appear as a pop-up when visitors visit the Library Website at www.lib.usm.my. Figure 1 illustrates the pop-up messages of USM Library MCO services on the website.

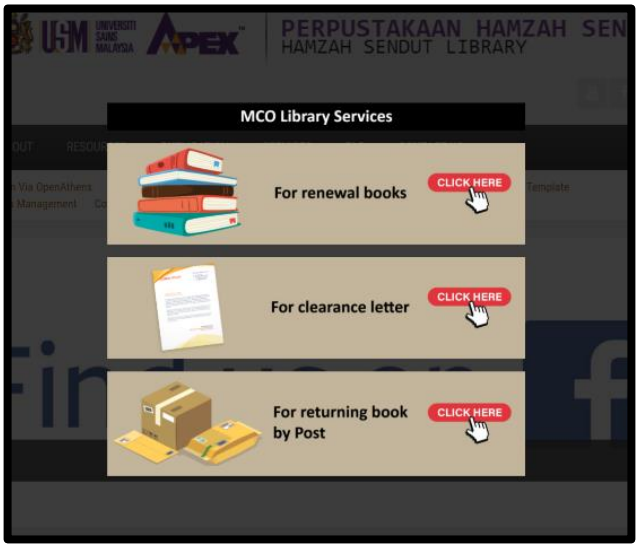


Figure 1: Pop-Up messages of USM Library MCO services on the website

Social Media (Facebook & Instagram)

Besides Email and Website, the Library uses Social Media (Facebook and Instagram) to build and maintain lasting relationships with customers. USM Library started to use social media in 2013. Since that, those platforms have become the most effective tools in spreading messages related to library services to our users. According to Eriksson (2018), social media is an effective tool for risk and crisis communication during disasters and emergencies. Announcements and promotions of each library service are always disseminated to users via both platforms. We also receive many inquiries from users through the Message Box. Li et al. (2020) stated that social media had used by people to look for and share information during the COVID-19 outbreak in an unparalleled manner.

Live Chat

USM Library has been offering the Live Chat service since April 2018 but only can be accessed at the Research Support Portal. The questions received are more to research support services. Due to MCO, the Library decided to go one step further by making Live Chat the primary tool to communicate with library users when physical interaction is almost non-existent. The Live Chat function has been moved to the Library's main website almost immediately.

Live Chat service has become the best platform for customers to obtain information, quick consultations, and know the latest developments of the Library and its activities. Questions raised through this platform include general questions, inquiries on circulation

(loan and return of materials), searching for Library materials, publishing on academic journals, off-campus access to online library resources, and Research Support programs. This service has successfully reduced the feeling of uncertainty and anxiety among USM students and researchers in facing difficulties of not having resources at hand, of not being able to be on the campus during MCO, which hinders their learning and research progress.

The high users' reliance on Live Chat services during the MCO period can be seen from the increment of the statistic compared to the year before, which was more than a 500 percent increase (the number of inquiries shoots up from 376 to 2395). As a perspective, the statistics in the first month of MCO increased by more than 1000 percent, where the number of inquiries received was 161 compared to only 12 in February 2020. This upward trend remained high from April to December 2020, which was 2,181 compared to only 376 inquiries in the same period of 2019. Table 1 presents the statistic of Live Chat Services for January to December 2019/2020.

Table 1: Statistic of Live Chat Services (January to December 2019/2020)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
2019	26	37	47	35	23	15	26	24	66	39	18	20	**376**
2020	14	12	161	254	215	350	210	170	154	193	335	300	**2395**

CONTINUiTY OF LIBRARY SERVICES

The closure of the USM Libraries' buildings suspended the users' ability to access the physical books, circulation services, in-person reference services, and interlibrary loan services. In response to this situation, USM Library quickly announced the continuity of the library services via the extended circulation services, the availability of online resources as a substitute to printed resources, document delivery, and online research support service.

Access to Collections and Extended of Circulation Services

The closure of the library building restricted access to all printed collections, including books, periodicals, and thesis. However, the online resources included e-books, e-journals, and e-thesis, which were still accessible via Off-Campus Login. USM Library had extended the borrowing period for the circulation services, and overdue fines were automatically waived. Table 2 lists the opening schedule and services offered during MCO starting 18 March 2020-11 July 2021.

Table 2: Opening schedule and services offered from 18 March 2020-25 May 2021

18 March 2020-	The library building closed. No fines were imposed. Online only.

8 June 2020	
9 June 2020- 11 October 2020	Limited library access (USM staff and students only).
12 October 2020- 6 December 2020	The library building closed. No fines were imposed. Online only.
7 December 2020- 12 January 2021	The library building closed. Borrowing and returning services are allowed on Monday, Wednesday, and Friday 9.00 AM-12.00 PM.
13 January 2021- 11 May 2021	Limited library access (USM staff and students only).
12 May 2021- 11 July 2021	The library building closed. No fines were imposed. Online only.

InterLibrary Loan and Document Delivery Services

Interlibrary loan is a service that helps users to get materials that not available in USM Library from other university libraries in Malaysia. This service is provided to the users under the cooperation of the Malaysian Standing Conference of National and University Libraries (PERPUN) network and the Librarians Association of Malaysia. All libraries under the PERPUN network agreed on information resources exchange with certain conditions (Perpustakaan Negara Malaysia, 2000). During library closures, the Interlibrary Loan Service is unavailable between USM Library and the PERPUN network. The service resumes back on 9 June 2021 after MCO (Phase 2).

While the interlibrary loan for books is suspended, the Document Delivery Service remains available with no interruption. Two Document Delivery Service is provided to the USM community named Article Request Services and Pay Per View Services. For Article Request Services, USM Library will obtain articles requested via PERPUN networks. When the articles were not available within this network, the request will be extended to Pay Per View services. The Library will purchase the articles directly from the providers or publishers, and the university will bear the cost of obtaining this article.

Research Support Services

Research support services can be defined as a range of services to support researchers and the institution's research strategies (Tang & Zhang, 2021). Si, Zeng, Guo, and Zhuang (2019) explained that academic libraries had prepared various solution strategies to provide researchers with innovative information services throughout the process of teaching, learning, and doing research. Based on each scope and phase of the research cycle, researchers can benefit from the moment the idea is created, implemented, disseminated, and returned (Gessner, Eldermire, Tang, & Tancheva, 2017). Frequent activities conducted under research support services in academic libraries such as bibliometric, research data management, open access, scholarly publications, search guides, consulting, and tool recommendations research assistance (Raju, Adam, Johnson, Miller, & Pietersen, 2015). USM Library had introduced Research Support Services on 23 January 2013 to enhance limited reference services. The USM Library research support services included research support training covering various topics involved in the research cycle, reference consultation, and research data management activities.

(a) Research Support Training

USM Library conducted the research support training for ten modules: 1) Literature Search, 2) Bibliographic Management Using Mendeley, 3) Google Drive for Research, 4) Google Scholar for Researcher, 5) Build a Research Profile, 6) Publishing Strategy, 7) Thesis Formatting Template, 8) Thesis Formatting with Microsoft Word, 9) Data Analysis Using SPSS (Basic) and 10) Evidence-Based Medicine. Traditionally, the training was conducted face-to-face at the library computer lab or any venue requested by the users.

In November 2018, USM Library had introduced the research support training online (webinar) using Webex Meeting Platform. Since that, USM Library had conducted the training using both modes alternately. Early experience in organizing online training provided an advantage for USM Library when the total lockdown was imposed in March 2020. As a result, MCO not affected the delivery of training to library users. The statistic for 2020 shows a 15% increment of the participants, which achieved 12,070 compared to only 10,764 in 2019. The increment of the participants and the great feedback received on each module show that the online teaching trend is positive towards the online mode offered by the Library. Figure 2 illustrates the statistic for Research Support Training participants (January to December 2019/2020).

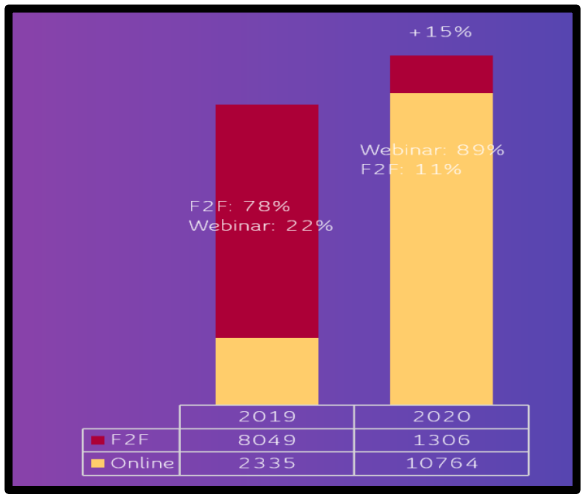
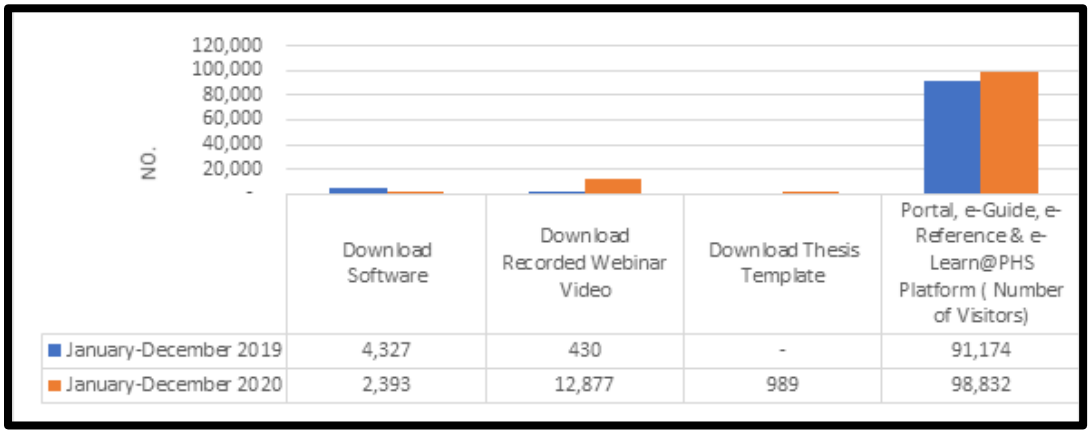


Figure 2: Statistic for Research Support Training participants (January to December 2019/2020)

(b) Online Learning Platform

Online Learning@PHS (accessible at: https://referencephsusm.wordpress.com/online-learning) has become one of the popular platforms for online learning among library users, especially during the lockdown period. The platform provides information such as e-Learn@PHS, e-Guides, and the Recorded Webinar Video services. The platform allows users to attend classes and workshops 24/7 place without limitations. In 2020, the number of videos downloaded by users was 12,877 downloaded compared to 2019, which is only at 431 downloaded, an incredibly significant increase (over 2,800%). The remarkably high percentage increase indicates the buoyant demand for consumer

education classes organized by the USM Library. The number of visitors who visited the Online Learning portal platform also increased from 91,174 to 98,832 in 2020, increasing 8.3% from the previous year. Figure 3 presents the statistics of Research Support Portal & Online Learning @PHS visitors for 2019/2020.



	Download Software	Download Recorded Webinar Video	Download Thesis Template	Portal, e-Guide, e-Reference & e-Learn@PHS Platform (Number of Visitors)
January-December 2019	4,327	430	-	91,174
January-December 2020	2,393	12,877	989	98,832

Figure 3: Statistics for Research Support Portal & Online Learning @PHS visitors (January to December 2019/2020)

(c) Massive Open Online Courses (MOOC)

In 2018, USM Library launched the first MOOC program known as Jom Cari Maklumat @Perpustakaan, where this program is designed as the library orientation for new USM undergraduate students. Later in 2019, another two modules were added made the total of MOOC courses available is three: 1) Jom Cari Maklumat @Perpustakaan, 2) Literature Search for the Beginner 3) Essential Publishing Tools for Researchers. USM Library MOOC aimed to enhance researchers' and students' skills and competencies. When MCO had restricted the movement of everyone in many aspects, MOOC will become a great tool that gives more flexibility to students and lecturers wherever they are, anytime without being limited to physical classes like the conventional education system to learn. Figure 4 illustrates the courses available for USM Library MOOC that accessible at the Online Learning Platform.

Figure 4: Courses available for USM Library MOOC

(d) Reference Consultations

Reference consultation services play a significant role in supporting the research of the USM community. This service is offered as a part of research support services that solve research-related problems faced by the students or researchers. The consultation is provided via various mediums, including face-to-face, telephone, email, and WhatsApp. Later, after the Library received a high demand for consulting services, the delivery of this service was improved by conducting Research Consultation Day, an open day concept whereby the customers can meet librarians to solve any research-related problems.

Besides email, telephone and WhatsApp, the Library introduced virtual reference consultation services in 2019 to help the off-campus users and those unable to present themselves physically. During this time, the demand for a face-to-face meeting is still higher compact to the virtual. After the COVID-19 crisis, this virtual meeting was the primary medium used, replacing the face-to-face meetings. Since librarians have become accustomed to online meeting tools such as Webex, Zoom, Microsoft Teams, and Google Meet in teaching sessions, they are given the freedom to choose any application as long as the session is smooth and effective.

Every user who wants to request the service must fill in the consultation booking form provided on the Library's website. Through this form, the facilitator or consultant related to the chosen topic will be identified. The consultant then will confirm the meeting via email according to the date and time proposed by the applicant and provides a meeting link for the session. Finally, the consulting services will run according to a schedule agreed by both parties. The duration depends on the level of complexity of a problem faced by

the requestor. Figure 5 presents the statistic for the reference consultations (January to December 2019/2020).

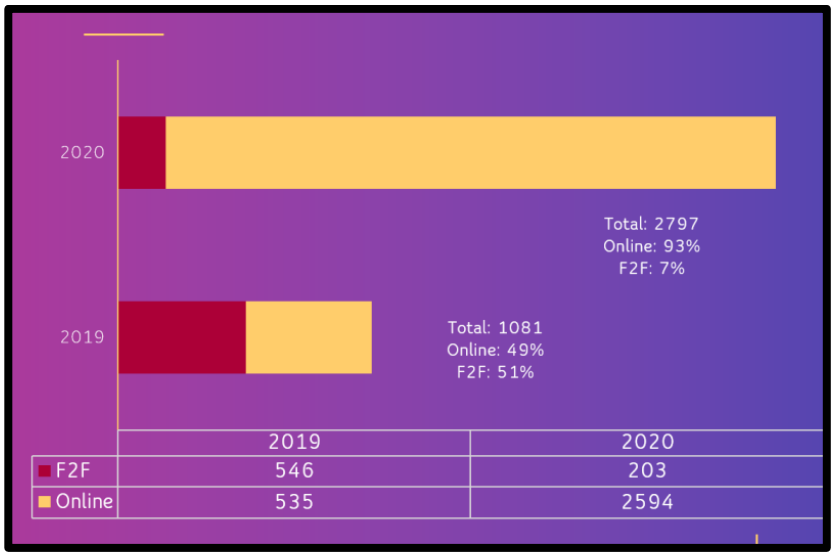


Figure 5: Statistic for Reference Consultations (January to December 2019/2020)

NEW INITIATIVES INTRODUCED DURING THE PANDEMIC

While emergency measures are taken to ensure the continuity of USM Library services, USM Librarians make an effort to be more proactive and innovative by introducing new services, including access to COVID-19 online resources, USM Library TV@Youtube Channel, Library Research Ambassador Program, and Research Data Management initiatives.

a) COVID-19 Online Resources

USM Library had provided a list of resources related to the COVID-19 pandemic on the Library Website to support combatting the spread of COVID-19. As stated by Ali and Gatiti (2020), librarians play essential roles in promoting public health awareness and assisting the researchers by providing and disseminating information, the latest development, research, and literature at the time of the pandemic. The information included in USM Library COVID-19 Online Resources included the COVID-19 Statistics & Data Analytics and a list of free COVID-19 resources provided by Publishers and Non-Profit Organisations. The COVID-19 Online Resources were accessible at: http://www.lib.usm.my/index.php/en/2015-06-22-05-20-57/databases/open-access-journals-2.

b) USM Library TV @YouTube Channel

The learning medium through the YouTube channel has become one of the most popular methods nowadays. The recorded features allow users to control the videos to play, replay, and pause whenever needed. USM Library started the Youtube channel in 2013, but the content has rarely been updated. In March 2020, the new working from home routine allowed USM Librarian to produce short research support videos and uploaded them on the Youtube channel. The channel has then been branded as the official of USM Library TV. At the end of 2020, 169 e-Tutorials videos have been uploaded, comprising ten playlists covering modules such as Searching Strategy, Publishing, Mendeley, Google Scholar, and other informative content. In 2020, the channel had gained 24,300 cumulative views with 540 hours of footage and had 1,197 subscribers. Figure 6 presents the statistic of the USM Library TV@Youtube channel (March to December 2020).

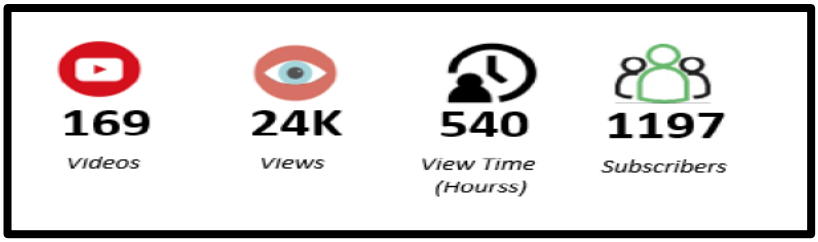


Figure 6: Statistic of USM Library TV @Youtube Channel (March- December 2020)

c) Library Research Ambassador (LRA) Program

Library Research Ambassador (LRA) is an innovative program introduced under Research Support Training. LRA is appointed among USM postgraduate students and academicians who volunteer to share their expertise. This program aims to enrich the research support modules and expand the training on other topics that may enhance the researcher's competency and expertise. Throughout 2020, seven experts were appointed as LRA with expertise in various areas such as publishing, academic writing, graduate on time, and data analysis software. Nine sessions of training had been conducted with a total number of participants, 1,145. Table 3 lists the modules and statistics of the LRA program for January to December 2020.

Table 3: Modules and Statistic of LRA Program (January – December 2020)

Modules for LRA	**Category of the Ambassador**	**No of Ambassador**	**No of Session**	**Total Participants**
Academic Publishing with Open Journal System	Ph.D.Candidates	1	1	47
Academic Writing Tools	Ph.D. Candidates	1	1	402
Academic Writing Using Latex	Ph.D. Candidates	1	3	157
ATLAS.ti for Literature Review	Ph.D. Candidates	1	1	200

Graduate on Time: Challenging & Milestones	Academicians	1	1	149
How to Conduct Systematic Literature Review	Ph.D. Candidates	1	1	115
Structural Equation Modelling Using MPlus	Ph.D. Candidates	1	1	75
		Total	**9**	**1,145**

Research Data Management (RDM) Initiatives

The management of research data is one of the essential roles provided as part of the research support services by the USM Library, specifically by the Research Data Management (RDM) team. Besides the routine tasks, the RDM team had come out with several new initiatives during the pandemic included 1) strengthening Researcher Profile @Directory of Expertise USM, 2) Journal list based on subject @RDM Portal, 3) creating awareness via videos and infographics poster, and 4) conducting training and workshop.

a) Strengthening Researcher Profile @Directory of Expertise USM

Directory of Expertise USM (accessible at: http://experts.usm.my/) is a platform that provides information of USM Experts, including the background, Researcher IDs for Scopus, Google Scholar, ORCiD ID, and Researcher/ Publon ID, citation data, publications, and others. However, there are cases where USM Researchers have various IDs on the SCOPUS, which affected the accuracy of research data output and citations in this platform. As the solution to this problem, the RDM team combines the duplicate Author ID and helps researchers build and update their researcher profiles. By the end of 2020, 202 Researcher Scopus IDs were successfully merged, edited, and updated. The result is a) the display for the Directory of Expertise is updated and robust, b) research cooperation and collaboration with the external parties may increase, c) accurate information of Researchers' publication and citation data, and d) increase the visibility of USM researchers to the public. Figure 7 illustrates an example of the USM Experts interface at Directory of Expertise USM.

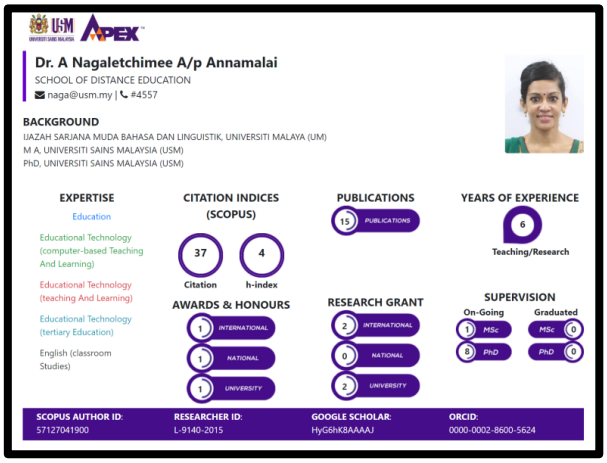


Figure 7: Example of USM Experts interface at Directory of Expertise USM

b) Journal list based on subject @RDM Portal

RDM Team had developed Research Data Management Portal, which included Journal List based on the field related to USM Research. The Portal allows scholars and postgraduate students to search for journals related to their area from Scopus, Journal Citation Report (Web of Science), and MyCITE. In addition, the team also provided personalized assistance for the researchers by providing the list of indexed and peer-reviewed journals that might be considered by the researcher for publishing, specific to their expertise. In 2020, the RDM team had assisted researchers from the School of Management, School of Computer Science, Centre of Knowledge, Communication, and Technology, and Centre for Islamic Development Management Studies (ISDEV), which involved over 31 fields. Figure 8 illustrates the example of an indexed journal list in the RDM Portal.

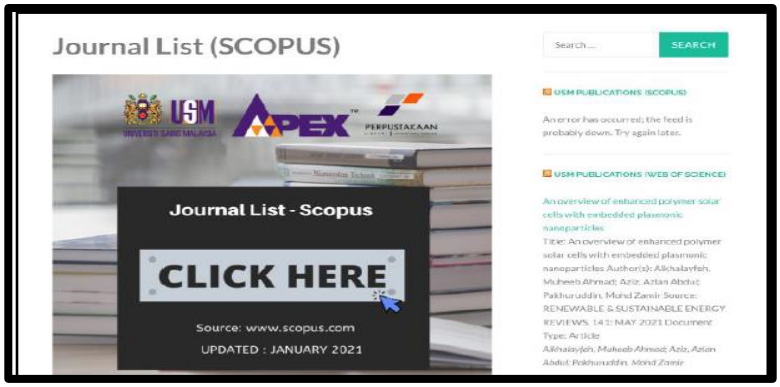


Figure 8: Example of Indexed Journal List in RDM Portal

c) Creating awareness on RDM via YouTube videos and infographics poster

Besides providing information on the indexed and peer-reviewed journals on the Portal, USM Library committed to spreading awareness about RDM activities to USM researchers. In 2020, five videos related to RDM been uploaded to USM Library TV @YouTube Channel, and over 20 infographic posters had been designed and disseminated via USM Library Facebook and Instagram Channel. Figure 9 illustrates the RDM Video Playlists at USM Library TV @Youtube Channel.

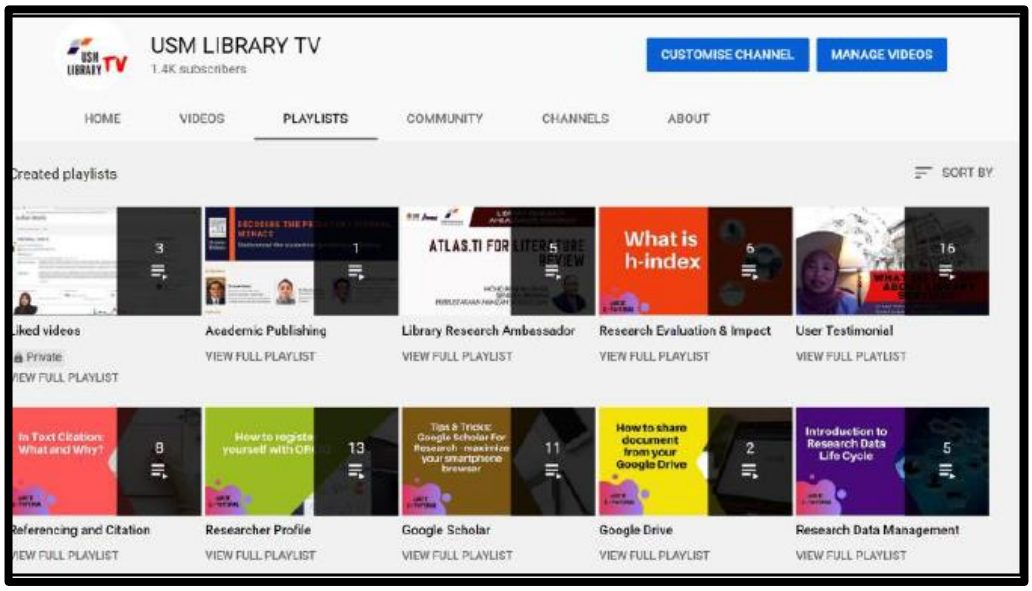


Figure 9: RDM Video Playlist at USM Library TV@Youtube Channel

d) Training and Workshop

In addition, the RDM team also had conducted several training sessions and workshops on RDM and Malaysia Research Assessment (MyRA) Guidelines. In 2020, more than five training had been conducted included 1) Research Data Management and MyRA@USM Workshop during MyPHT 2020, 2) Webinar on Publication Strategy for Academicians (Essential Publishing Tools for Researchers), and 3) Talk on RDM and MyRA during Library Tour Program at the various schools and research center. The training had been attended by over 500 participants among USM researchers and academicians.

INITIATIVES INTRODUCED A YEAR AFTER THE PANDEMIC

After a year of pandemic, while Malaysia is still dealing with the crisis of the COVID-19, USM Librarian keeps being agile, creative and continues to enhance library services by initiating new projects, including the Open Science initiatives, Virtual Counter services, and Research Support @Facebook.

Open Science Initiatives

The Open Science initiative as part of USM Library research data management services was carried out in supporting the development activities of the Open Science platform by the Ministry of Science Technology and Innovation (MOSTI) at the national level. Various plans and strategies were carried out, including establishing an Open Science Committee at the USM Library level, the development plan for Open science policies and infrastructures, promotion, awareness of Open Science practices, and many more.

Kicking in 2021, the USM Library, in collaboration with the USM Research Creativity & Management Office, has organized a symposium entitled “Symposium on Open

Science@USM: Are We Ready?" on 4 March 2021. This symposium targeted USM academicians and researchers as a promotion and awareness program where invited speakers from the Malaysian Open Science Platform and USM Library talked and shared relevant knowledge about Open Science practices. It has pulled a good number of crowds with an attendance of 200 participants. Apart from that, six USM librarians and 4 USM researchers have completed the Training of Trainers Program on Data Stewardship for Open Science and become USM data stewards with the role of assisting and managing research data for USM. Figure 10 presents the poster for the "Symposium on Open Science@USM: Are We Ready?".

Figure 10: Poster for the "Symposium on Open Science@USM: Are We Ready?"

Virtual Counter

Starting February 2021, USM Library had introduced a new service known as Virtual Counter, which allows the users to be assisted by USM Librarian just like at the physical counter. The idea of this service was coined from the online reference consultation services using online meeting software. Starting from the service from the Live Chat platform at Library Website, the user will be asked to choose between two options: 1) Meet the Librarian virtually, or 2) continue chatting. If the user wants to meet with the Librarian virtually, they will be asked to join the online meeting platform. The virtual counter may offer direct communication between users and librarians without being present at the library building. The service is still at the experimental stage where the Librarian needs to identify the software that may provide the best and most efficient virtual counter solutions. The Librarian also needs to consider technical problems or difficulties at the users' side, including software installation or download required, incompatible browser or corporate firewall, trouble joining the meeting, insufficient

internet bandwidth, and lack of experience with the online meeting technology. Figure 11 illustrates the Virtual Counter services at Library Website.

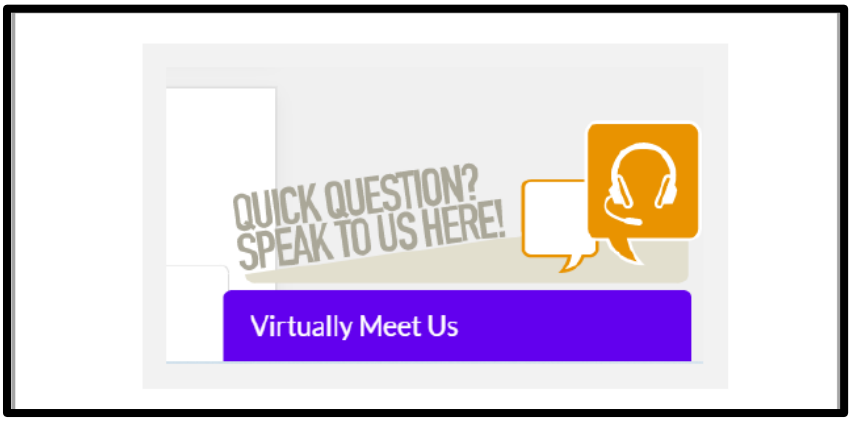


Figure 11: The Virtual Counter interface at Library Website

Research Support @Facebook

Research Support @Facebook initiative is another new strategy executed by USM Library for the year 2021. This initiative aims at ensuring the Library's research support services go global and reach a wider audience apart from its local users. First conducted on 12 February 2021, this strategy focuses on 10 minutes sharing sessions by USM librarians, researchers, academics, and library ambassadors on various topics that include different research tools or platforms, plus tips and tricks that support research activities. All the sessions were conducted as live streaming at USM Library's official Facebook platform. Among topics covered are plagiarism checkers, visualization tools, article searching platforms and applications, big data platforms, and many more. Besides going global, the live session is also a good way for public engagement, enhancing presentation skills, and building up the confidence of the USM Librarian. Based on the analysis conducted, this initiative has boosted Library Facebook platform likes, views, and engagement tremendously, supporting USM Library visibility to the masses. Figure 12 illustrates The Live Streaming Video of Research Support at USM Library Facebook.

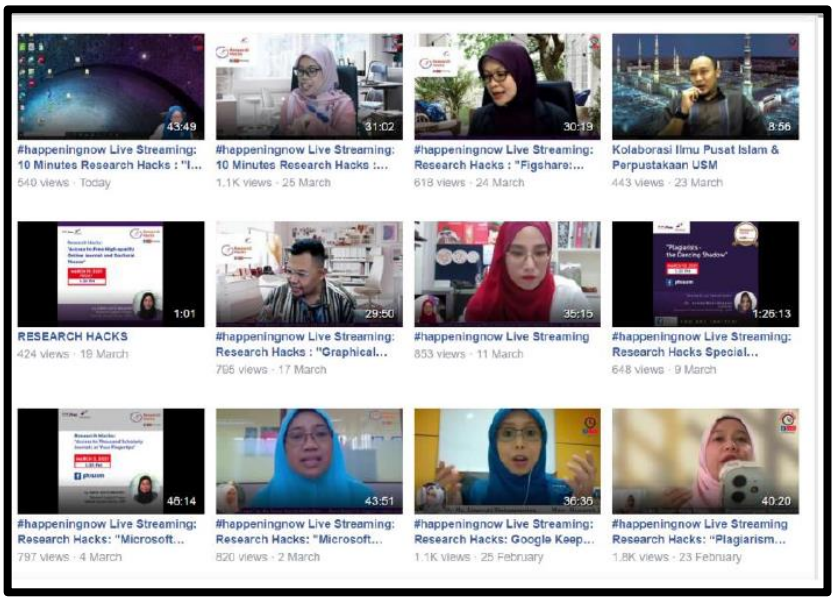


Figure 12: The Live Streaming Video of Research Support at USM Library Facebook

CONCLUSION

At the challenging time of the COVID-19 outbreak, USM Library was able to communicate effectively, continue providing access, and be innovative by offering new initiatives and programs. To ensure the Library may reach as many end-users as possible, USM Library tailored news and updates via various communication channels, including email, website, social media, and live chat. The communication strategy implemented by USM Library is supported by Duhon and Jameson (2013), who pointed out that library outreach is about reaching as many patrons as possible and informing them about the resources beyond their awareness or means to access. Despite the closure of library buildings and the limitations of access to physical resources, USM Library managed to offer virtual services involved access to online collections, document delivery, and research support services. In line with Ali and Gatti (2020), whereby discovered that most libraries managed to offer virtual services such as document delivery, literature search, and online reference services during the pandemic. Moreover, USM Library had introduced new initiatives and programs, including access to the COVID-19 online resources, USM Library TV @Youtube Channel, Library Research Support Ambassador, and Research Data Management initiatives. In 2021, USM Library had introduced the Virtual Counter service, Open Science initiatives, and Research Support @Facebook.

In conclusion, the COVID-19 era provides an eye-opener to the diminishing value of print collections and the increasing need for online for everything. It also a teachable moment where academic librarians learn how to deliver services under “new normal”. USM Libraries has made the best efforts to reach the users and ensure library services’ continuity during challenging times. With the COVID-19 pandemic still ongoing, USM Libraries will continue to explore new possibilities and flexibilities to offer better services to the users. Nevertheless, the academic Library needs to reconsider and redesign existing services towards digital and online for the post-pandemic.

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Positive Impact of COVID-19 Pandemic on Library Services

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ABSTRACT
While people are discussing the bad side of COVID-19 pandemics such as death, unemployment, bankruptcy, there is also the positive impact of the pandemic particularly on library services. Initially, ICT was considered a competitor that threatened the existence of libraries in Indonesia, however, it has now become an important tool in maintaining the existence of libraries during the COVID-19 pandemic. This can be seen from the innovations made by the Muhammadiyah University of Yogyakarta Library which rely on ICT to adjust library services during the COVID-19 pandemic. This research was conducted using a qualitative approach. Data was obtained from two librarians who work in the Muhammadiyah University of Yogyakarta Library. The collection of data included interviews, field observations, and analysis of the library website. It is known that there were various service adjustments made by the Muhammadiyah University of Yogyakarta Library during the COVID-19 pandemic. Onsite services are tightened by implementing the Health protocol, and online services provide a variety of facilities that can be accessed independently by the user. Online services maximize the use of ICT to reach users who are outside the region. The COVID-19 pandemic has encouraged libraries to maximize ICT and improve librarians' ability to operate ICT.

Keywords: COVID-19; ICT; Indonesia; Library services; Positive impact.

INTRODUCTION

The COVID-19 pandemic is a disease outbreak that has occurred widely throughout the world, including in Indonesia. The COVID-19 pandemic has forced the community to be adaptive to various forms of social change that have occurred. People are forced to carry out routines that are adjusted to standard health protocols, such as physical distancing, wearing masks, and washing their hands before and after touching objects.

The COVID-19 pandemic has caused unplanned social changes. Social change occurs sporadically (suddenly and unevenly) and is not desired by the community. Since the beginning of the emergence of this virus in Indonesia, the government has urged people to study, work and worship at home. During the COVID-19 pandemic, many institutions were closed. The closure was carried out because of the prohibition against activities outside the home. this is done to prevent transmission of the virus. The habitual pattern of people who like to gather together is now required to get used to social restrictions. The public is encouraged to carry out physical distancing and social distancing (Ministry of Health, 2020). The changes that have occurred due to the COVID-19 pandemic have

had many negative impacts, such as increased unemployment, bankruptcy, to the economic crisis (Rizal, 2020). On the other hand, the COVID-19 pandemic can have a positive impact on library services in Indonesia.

The general thought of most librarians in Indonesia before the pandemic was to assume that information technology was a competitor that threatened the existence of libraries. The emergence of the COVID-19 pandemic changed that thinking. Libraries are intensively utilizing information technology to adjust library services based on established health protocols. Libraries are forced to adapt to situations that limit the distance between individuals, thereby reducing the visiting capacity of the library. In addition, in university libraries, such as the Yogyakarta Muhammadiyah University Library, the majority of users are students. Currently, universities have not been able to carry out face-to-face lectures optimally, so most students return to their respective regions of origin. Due to the large number of users who are outside the region, it requires the Muhammadiyah Yogyakarta university library to be able to serve users without physical services. One of the possible efforts is online services by utilizing information technology.

ICT provides a variety of benefits that can help the Muhammadiyah University of Yogyakarta Library to maintain its existence during the COVID-19 pandemic. ICT can provide easy online access through virtual space so that it can be reached from various regions. virtual space can also have more capacity than physical. This can be used as a promotional ground to introduce the name of the Muhammadiyah University of Yogyakarta Library to the public. ICT is a library partner. The COVID-19 pandemic has made librarians aware that to maintain the existence of libraries, they must see everything as an opportunity to collaborate and even take advantage of it.

The COVID-19 pandemic has encouraged the Muhammadiyah University of Yogyakarta to support the library in maximizing the use of ICT. this is done as an effort in the process of adjusting library services. On the other hand, Muhammadiyah University of Yogyakarta Library does not close its onsite library services. everyone can still visit the Library freely. During the COVID-19 Pandemic, Muhammadiyah University of Yogyakarta Library continued to open onsite services and continued to improve online service innovation to maintain its existence.

Based on the explanation above, it is known that the COVID-19 pandemic caused various impacts that occurred in the Muhammadiyah University of Yogyakarta Library, especially on library services. library services have shown a lot of improvement compared to before the COVID-19 pandemic. the development of library services occurs as a form of the adjustment process for library services. Therefore, this study seeks to describe how the development of library service adjustments during the COVID-19 pandemic.

LITERATURE REVIEW

Library Services amidst the COVID-19 Pandemic

Libraries make adjustments to their services in an effort to maintain their existence during the COVID-19 pandemic. Service adjustments resulted in changes in work patterns. Prior to the COVID-19 pandemic, libraries were more focused on providing services to users

directly. while during the COVID-19 pandemic, library services were reorganized so that they would not become a crowded place. The challenge faced by libraries is how libraries can provide high-quality services to users during the pandemic (Cox, 2020).

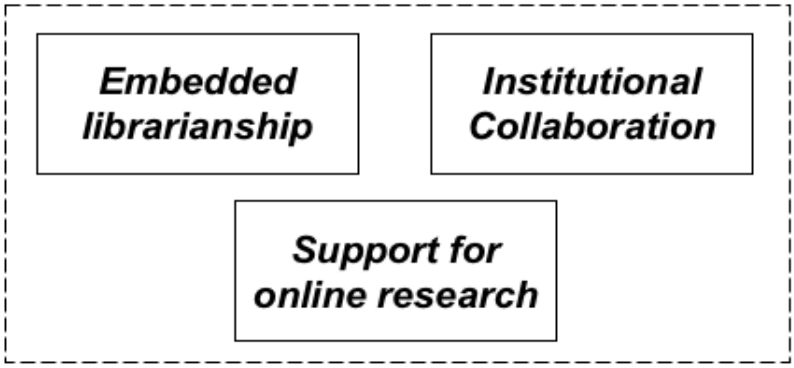

Figure 1: Library Services during the COVID-19 Pandemic (Walsh & Harjinder, 2020)

Embedded Librarians is a service that supports the teaching of necessary information skills, such as an online library module. Librarians can serve consultations for users related to library collections and research. Libraries can conduct online courses to ensure readers acquire information literacy skills due to the closure of the library. Librarians can assist users by developing course content, holding virtual work hours, providing research consultations, and assisting in identifying and linking course content.

Institutional Collaboration is a collaboration service between libraries. Libraries make their collections available to other libraries. Libraries need to continue to collaborate between libraries and various parties to achieve their goals. Collaboration between libraries can provide benefits in various activities held. This is due to the support of various stakeholders to improve the quality of activities in the library. As long as the library is closed, inter-library loan services for printed materials are not available, but digital material searches for library users are still being served. Collection of library materials is done through digitizing large-scale collections and implementing open access. Libraries should have started developing digital collections. Libraries need to work together to digitize printed collections amid the COVID-19 pandemic. this was done to achieve large-scale digitization. One way that this can be done is by collaborating between institutions to enrich digital collections.

Support for online research. Laboratory closures and restrictions on social contact create an obstacle to conducting research. Libraries can assist researchers by developing virtual spaces to collaborate remotely. Libraries have to rethink their websites because library websites are the main route of interaction with users. Following usability principles, library websites can be developed to be more user-friendly, responsive, and customizable. In the era of ICT, all activities can be assisted by the presence of technology, such as library services. Services are built using virtual technology, such as websites and social media. The spread of COVID-19 has resulted in libraries being required to develop online services to reach visitors who cannot directly access the library. This is by the opinion of Chick et al (2020), that ICT can help bridge the education gap during the COVID-19 pandemic. Remote reference and specialized information services are required to provide synchronous online information support to researchers during isolation.

International Federation of Library Associations and Institutions (IFLA) issued guidelines for being able to provide services during the COVID-19 pandemic which consisted of (IFLA, 2020):

1. Limiting numbers in the library. this is one measure to reduce risk by limiting the number of people in the library at any one time. This will make it easier to maintain social distancing.
2. Organizing events and activities. This is an effort to prevent virus transmission by organizing library activities and the number of participants in the event by allowing up to 100 people, but with a distance of 2 meters.
3. Promoting hygiene, namely promoting the importance of hygiene standards such as ensuring that staff wash their hands frequently, access to library materials using gloves and masks, and providing hand sanitizer available at the entrance (and possibly in addition to equipment such as computers). In particular, continued regular hand washing by staff is strongly recommended (both before and after contact with the material).
4. Keeping Staff Safe, namely ensuring that the staff is fit, healthy, and comfortable in providing services. Librarians are encouraged to work in the library at certain hours of the day and allow staff to work in shifts.
5. Handling materials. This is an effort made to minimize the risk of infection through contact with materials carrying coronavirus, such as imposing a waiting period (quarantine) before handling returned books with a quarantine period of 24 hours for paper, and 72 hours for plastics. For materials with plastic covers, such as cleaning DVDs can use alcohol wipes and immediately return to circulation.
6. Social distancing or physical distancing is done by maintaining a safe distance between individuals to reduce the risk of the virus being transmitted from one person to another. The recommended distance varies from country to country but does not appear to be under 1m (3-4ft). This is done to protect users from possible transmission due to coughs, droplets, and sneezing that are emitted through the air.
7. Delivery Services. it is a book delivery service to vulnerable groups and others. For example, the Radford College School library in Australia has a click-and-collect service for its collection of books. Libraries can also work with taxi companies to provide access to books, such as the Central Public Library of Veria in Greece.

RESEARCH DESIGN

This research is a descriptive study with a qualitative approach as a guide for conducting and determining the flow of research. Qualitative research is the collection of data in a natural setting to interpret the phenomena that occur in which the researcher is a key instrument (Anggito & Setiawan, 2018: 8). This research was conducted to describe the positive impact of the COVID-19 pandemic on the process of adjusting library services at the Muhammadiyah University of Yogyakarta Library.

The sampling technique was carried out using purposive sampling. According to Idrus (2009), purposive sampling is a sampling technique used by researchers if they have certain considerations in sampling. Character determination is taken because not all

members of the population have the opportunity to be used as research samples, as well as the limitations of researchers to reach all of them. The following are the characteristics of the sample of this study.

1. Librarian at the Muhammadiyah University of Yogyakarta Library.
2. Knowing the service adjustments made by the Muhamadiyah University of Yogyakarta library.

Based on the specified sample criteria, 2 informants were selected to obtain research data. Data retrieval is carried out through various processes, as follows.

1. Interviews, conducted by asking several research questions to informants to obtain primary data.
2. Field observations were carried out by directly visiting the Berdikari Book shop and library to find out what conditions are happening in the field.
3. Website and social media analysis, conducted by visiting the website https://library.umy.ac.id and various social media owned by the Muhammadiyah University of Yogyakarta Library.

Data were collected from various sources to complement and confirm the findings of data from one source to another. The data that has been obtained is then analyzed using a model from Miles and Huberman (1994), namely that the data analysis activity is continuous and is carried out interactively until the data is saturated. This model has three stages, such as:

1. Data reduction: Refers to the process of selecting, focusing, simplifying, abstracting, and modifying data that appears in field notes or written transcriptions.
2. Presentation of data: This stage is to present an ordered and compressed collection of information that allows it to be used as a reference for drawing conclusions and actions.
3. Inference: Deciding - noting regularities, patterns, explanations, possible configurations, casual flows, and propositions.

RESULTS

Muhammadiyah University of Yogyakarta Library Services before the COVID-19 Pandemic

The Muhammadiyah University of Yogyakarta Library is one of the libraries of private universities in Indonesia. The library is located on Jalan Brawijaya, Kasihan, Bantul, Yogyakarta Special Region. As a university library, Muhammadiyah University of Yogyakarta Library provides a variety of services according to the needs of its users who are the academic community, as follows.

1. Check Turnitin. Turnitin is an application used to check the level of similarity of text with sources on the internet. The maximum limit set by UMY is 20%. So that if the turnitin check results exceed the predetermined limit, it must be revised. Turnitin checks can be done through various library units at UMY, or by email.

2. Circulation. Circulation services are divided into 3, namely borrowing, repaying, and extending book loans.
3. Information literacy, this service is in the form of training for Muhammadiyah University of Yogyakarta's academic community, both for students and for lecturers. This training will learn how to determine research topics, find credible references, search journal databases, and learn related writing techniques.
4. The computer room, Muhammadiyah University of Yogyakarta Central Library provides 40 units of computers that can be accessed by the Muhammadiyah University of Yogyakarta academic community. The computer room is located in Building D. lt 3.
5. Jaws: a special computer for the visually impaired, this service helps blind people to operate computers. The location is in Building D. LT 3
6. Repository, this service provides the work of Muhammadiyah university of Yogyakarta academic community, including Final Projects, Thesis, Thesis, and Dissertation. Physically, the repository room is in Building D. lt 2, while online it can be accessed via repository.umy.ac.id.
7. The library recites the Qur'an. Visitors who visit the Muhammadiyah University of Yogyakarta Library are given a special room to recite the Qur'an. The room is located in Building D. lt 3
8. Jogja Library for All (JLA) Catalog service with all university and school libraries in Yogyakarta. JLA can be accessed through http://www.jogjalib.com/.
9. Endnote training, Endnote is an application that can be used to automatically create citations, either bodynote, footenote, or bibliography. In minimizing the occurrence of acts of plagiarism, Muhammadiyah University of Yogyakarta Library organizes endnote training every Saturday. For students who want to take part in these activities, please register through the WhatsApp service on this website.

The Muhammadiyah University of Yogyakarta Library opens services to the general public, except for circulation services which are specifically restricted to students of the Muhammadiyah University of Yogyakarta. Everyone can visit and use the facilities in the library without any administrative processes.

Yogyakarta Muhammadiyah University Library Services after and during the COVID-19 pandemic

The process of adjusting services at the Muhammadiyah University of Yogyakarta Library during the COVID-19 pandemic can generally be described through 2 phases, namely in the first phase when a circular is issued to inform the closure of the library, and the second phase when the library reopens services.

a) First Phase

The first phase began when the Circular on the COVID-19 emergency response at Muhammadiyah University of Yogyakarta was issued in March 2020. All employees at the Muhammadiyah University of Yogyakarta were given the policy to be able to work from home, including librarians. This policy was taken as an anticipatory step in preventing and protecting librarians from the risk of contracting the coronavirus. The safety of librarians and visitors is a factor affecting the closure carried out by the Muhammadiyah University of Yogyakarta

Library. The closure of the library was carried out suddenly so that librarians at the Muhammadiyah University of Yogyakarta Library had not done too much preparation.

> "It was closed at the beginning of the pandemic and there was no proper preparation at that time"

The closure of the library has raised various problems, such as the need for users who want to access the library, borrow books, extend books, and want to return books. There is pressure from library users to encourage the Muhammadiyah University of Yogyakarta Library to reopen library services physically and add alternative services in virtual form for users who are outside the region.

> "It was closed for a while, after that it continued to open immediately because this is a private campus, so we have to pick up students. If not, we wouldn't get students, it's different from state campuses, which are still a lot of enthusiasts, even though they are neglected. "

The status of the Muhammadiyah University of Yogyakarta Library as a library from a private campus encourages efforts to be able to speed up preparation, as well as create alternative services that can accommodate the needs of the users. This has resulted in the Muhammadiyah University of Yogyakarta Library maximizing the use of ICT as a solution to maintaining the library's existence during the COVID-19 pandemic.

b) Second Phase

The second phase begins when the library starts to open online and onsite services. Onsite services are carried out by implementing health protocols, such as wearing masks, providing facilities for washing hands and checking body temperature before entering the library, and doing physical distancing while in the library.

> "Here, we provide a place to wash hands and check body temperature"

> "Even though there is no limitation on the number of students who come, we still impose physical distancing. So we are optimizing online services, besides that, there are still no lectures so there are still a few students who come "

The Muhammadiyah University of Yogyakarta Library does not limit the number of visitors, because the Muhammadiyah University of Yogyakarta has not conducted face-to-face lectures as a whole so that the number of students is still small. In addition, the existence of online services is also very influential in reducing the number of visitors who come, because some services can be carried out independently through online media. Online services are provided by providing alternative options that can be done remotely, such as the following.

1. Online library loan exemption, this service is provided for users who have completed their studies at the Muhammadiyah University of Yogyakarta. Users can carry out a library-free process through the website belonging to the Muhammadiyah University of Yogyakarta Library on the graduation library free menu.
2. Online book lending, this service is carried out by checking the availability of books through the website of Muhammadiyah University of Yogyakarta Library, namely https://library.umy.ac.id/koleksi/buku. If the desired book is available, users can borrow it via Whatsapp which has been provided by the Muhammadiyah University of Yogyakarta Library, while to take the book, it still has to be taken directly to the library.
3. Online extension of lending, this service can be done through the library website on the student self-service menu.
4. Services through social media. The social media used are WhatsApp and Instagram. Whatsapp as a media used to communicate intensely with librarians when experiencing unmet needs or problems, while Instagram is a medium for conveying information developments that are owned by the Muhammadiyah University of Yogyakarta Library.
5. The resource guide is a system/service that displays various references that have been grouped based on their reference category and adjusted to each study at the Muhammadiyah University of Yogyakarta. This is done to make it easier for users to find references according to their needs. The Resources Guide system/service can be accessed by anyone through the address library.umy.ac.id then click the Resources Guide menu. In this menu, we can select references according to the study program or desired reference category. If the user finds a reference that has not been entered into the system/service, he can contact the admin of Muhammadiyah University of Yogyakarta Library via the Whatsapp icon on the website.
6. Book returns can be done by using an expedition service. Users who are outside the region and want to return books can use expedition services to deliver borrowed books to the Muhammadiyah University of Yogyakarta Library. Users can coordinate the delivery process with librarians via WhatsApp.

Apart from technical services, Muhammadiyah University of Yogyakarta Library also tries to provide services to increase user insight, namely information literacy services, and webinars. Information literacy is a service in the form of training for Muhammadiyah University of Yogyakarta's academic community, both for students and lecturers. During the COVID-19 pandemic, information literacy services were held online through a zoom application subscribed to the Muhammadiyah University of Yogyakarta Library. Webinars are online seminars conducted through the zoom application.

During the COVID-19 pandemic, Muhammadiyah University of Yogyakarta Library often held webinars through a zoom application with various themes. The capacity of participants in the webinar is quite a lot so that it can accommodate participants from other institutions to participate in activities carried out by the Muhammadiyah University of Yogyakarta Library. This can also be used as a

promotional event for the Muhammadiyah Yogyakarta library so that it can be recognized by the wider community.

The adjustments that occurred in the Muhammadiyah University of Yogyakarta Library during the COVID-19 pandemic were inseparable from the role of ICT. There was a shift where initially ICT was only used to support library services, but during the COVID-19 pandemic, this technology played an important role as one of the main facilities in library services. This is a positive impact that occurs due to the COVID-19 pandemic, in addition to libraries becoming more developed in maximizing ICT, it can also improve the quality of librarians to be more literate about ICT.

CONCLUSION

Service adjustments that occur at the Muhammadiyah University of Yogyakarta Library are divided into 2 phases, namely the initial phase when the library is closed to prevent transmission of the coronavirus, then the second phase when the library reopens onsite services and adjustments are made by adding online services. Onsite services are still carried out to serve users who need a place to study and do their final assignments. onsite services are performed by executing health protocols. Online services have an important role to play in reducing the number of visitors so that crowds do not occur and reach users who are outside the region. Therefore, Muhammadiyah University of Yogyakarta Library tries to maximize ICT.

COVID-19 pandemic has encouraged the Muhammadiyah University of Yogyakarta Library to be able to maximize ICT. ICT is used to maintain the existence of libraries during the COVID-19 pandemic. This has a positive impact on the development of library services and improves the quality of librarians.

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Reaching Users through Facebook in Pandemic Situation: The Malay Studies Library, University of Malaya Experience

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ABSTRACT
The Malay Studies Library (PPM) is one of the special libraries in the University of Malaya Library network that serves Academy of Malay Studies (APM) users. This paper aims to discuss the responses taken by PPM to continue serving its subject- based community through social media platform i.e., Facebook despite the pandemic situation. Primary information derived from the built-in Facebook statistical application and librarian experience in managing the dissemination of subject -specific information contributed to the understanding the users' information needs. The findings shown that each format of content evoked different users' interest. Users are also using the platform as medium of communication with the librarian.

Keywords: Malay studies, Malay Studies Library, Social media, COVID-19, Facebook, Liaison librarian

INTRODUCTION

The Malay Studies Library Facebook (PPMFB) https://www.facebook.com/ malaystudieslibrary/ has been in service since 2014. It is managed individually by Mr Haslan Bin Tamjehi, The Librarian of Malay Studies, University of Malaya. The main purpose of the library Facebook is to be a medium in promoting the collection, services and activities of The library. The Facebook Platform was chosen due to its popularity among students. Almost all student bodies in The University of Malaya have their own Facebook sites. By subscribing to Facebook it is seen a strategic move to approach students online. When COVID-19 virus outbreak raging in the country. The function of the PPM Facebook is extending from promotional platform to subject specific information provider.

Library operation during MCO

The enforcement of MCO on 18th March 2020 the library is minimizing its operation by fulfilling online book request from in -campus users. Only library staff is allowed to enter the library to work. User entry to the library is technically not allowed. The counter service is limited to book returning. All returned books have to undergo 3 days quarantine

process in a special box for disinfection. If meeting with user is necessary standard procedure is observed such as wearing mask, scanning Mysejahtera app, filling up visitor record book, hand sanitization and social distancing. The meeting point is only up to designated area of the service counter. In April 2021 users were allowed to make seat reservation to enter the Library.

However, due to the recent surge of second wave of COVID-19 in the country, third MCO is enforced, and the library is totally closed to users and library staff. This pandemic contributes to disruption and inconsistency of the library service delivery which in return causing users dissatisfaction.

PROBLEM STATEMENT

COVID-19 pandemic has affecting University operations including library service. the closing of Malay Studies library interrupted student learning and research. Social media platform such as Facebook can be an alternative to help those students to get access to the information related to Malay Studies.

OBJECTIVES

The objectives of this paper are:

1. To discuss the responses taken by Malay Studies Library via social media app e.g. Facebook to serve its users during current pandemic situation.
2. To describe challenges in providing services via Facebook for subject specific online community.

LITERATURE REVIEW

Review of literature information about related subject of research from its findings, methodology and contribution to the topic of highlight. Philips (2011) described about the feasibility of Facebook in academic library as a mean of service delivery. The analysis of Facebook pages of selected academic libraries in Illinois revealed Facebook dynamic could cultivate relationship between academic ibraries and student. Usage of Facebook among librarians presents themselves as approachable (Garcia, Elbeltagi, Dungay & Hardaker, 2015). The study discussed whether Facebook social network support informal learning and peer support. Social network analysis (SNA) demonstrated student in central in the central of the network tend to remain in course and achieve their qualification.

Kai, Pierri, Pik, Axelrod, Torres-Lugo, Bryden & Menczer, (2021) made comparison between Facebook and Twitter in the dissemination of COVID-19 misinformation. Data based on identified keywords from Facebook and Twiitter Post were analysed. The finding shown infodemic content is coordinated sharing. Facebook is more effective than Twitter in combating the infodemic due to stronger role of verified accounts of the platform. Boholano & Cajes (2021) studied the reasons and feedback of Cebu University students of using Facebook. Mixed method was used to gather information. The result revealed frequent use of Faceback may cause adversed effect. However, Facebook is beneficial in information exchange and collaboration in the group chat. It is a learning tool in instruction during COVID-19 pandemic to students and lecturer.

METHODOLOGY

Library Facebook Performance data in three months (1st April to 30th June 2021) was analysed to see how user responded to the posted content. The data from the specified period were taken as a sample to see users' preferences and reaction over the posted contents on the PPM Facebook page. The underlining objectives of designated time span can be described as: First month, identifying to be observed contents; Second month, to see the pattern of preference; Third month, to confirm the pattern of user most preferred content. The contents were ranked from 1st to 4th based on the highest to lowest score in Page Reach for each month. The overall rank is also provided to give general overview of user content preference. Page reach was chosen as main ranking criteria since it indicates the number of users who saw a PPM page content. Engagement is paired with Page Reach to enhance the analysis process. Additionally, the accumulation of experience of the librarian in charged in preparing content and managing the Facebook itself contributed as a primary source for this research.

RESPONSES VIA FACEBOOK

The pandemic has deprived users' privilege to access library collection. Immediate action must be taken by PPM to support their information needs. Mobilizing the existing Facebook page to serve library users in online environment is considered as the fastest and best alternative to reach them during the pandemic. The Facebook page is optimized by PPM to:

1.To supply information

Regardless of the current situation, it is the responsibility of a PPM to provide subject - related content on Malay Studies. Most of the resources about Malay Studies is largely available in printed format. Since the Librarian in charge has some understanding about the field, relevant information from available source with him is shared with the users in the page.

2. informing available online resources.

The page is used to inform users with available online resources on the subject. It gives information that direct user to the online resources provided by UM Library or other entities.

3. Give motivational words / to console

The enforced Movement Control Order (MCO) may cause mental Fatigue, stress and loneliness. Instead of providing information, the Library Facebook is becoming platform of interaction with users, it tried to console users with motivational and inspirational words to promote positivity. By consistent interaction, user will feel the librarian presence as virtual companion. Greetings, and whishing users with good health may give positive effect to their lives.

4.Safety reminder on COVID-19

Consistent reminder posted on COVID-19 prevention and precaution to instil awareness.

5. Library updates
To update users with current development of PPM and University Malaya Library in general.

6. Answering library queries.
Queries that channelled comment and Facebook Messenger are entertained by PPM librarian. Questions on library operation, book renewal, fines as well as information request received as personal message in messenger.

CONTENT OF PPM FACEBOOK

The type of content in PPM Facebook are text, image, video, web links. The medium language of the PPM Facebook content is Malay language. It is the main medium of instruction in the Academy of Malay Studies, University Malaya.

The most posted content is in the text form. The text is a selected quotes from books and journals related to the field of Malay Studies. The text itself is available in several forms. First, mere plain text. Secondly, a text with a graphic background which created with graphic apps and converted as JPEG file. Thirdly, a text directly captured with smartphone camera and edited with a built-in app from dailies such as Sinar, Utusan Malaysia, Berita Harian and, New Strait Times. The latter two text formats are considered as image by Facebook.

Preparation of the content involves several procedures. It begins with determining subject searching for resources selection and evaluation (this involved scanning and reading exercise). When the quote is selected, it is copied by typing the quote and with complete citation to avoid plagiarism. After that proofreading process is taken place to avoid misspelling. In average It takes 16 minutes to complete 16 lines text. It is times consuming undertaking but worth it.

The content mainly based on the five main subjects division of Academy of Malay Studies mentioned earlier. This includes their related subdivisions. For example, ekonomi Melayu (for Malay's economic condition and activities) Sejarah Melayu (for Malay historical criticism, and origin). However, there are also complimentary subjects content such as, research methodology guide. Hikmah which consist of wisdom quotes derived from Malay scholars. Others are Library collection highlight updates, activities announcements, links of webinar, conference paper call, ads for faculties activities.

Content organization
PPM Facebook posting is released daily. In average there are three posts posted per day. Minimum of one post whenever the librarian is engaged with urgent task. To organize the posting of the page content. A daily schedule is devised to keep track and guided. Each day is assigned with a specific content subject: Monday: Malay Language; Tuesday: Malay Literature; Wednesday: Malay Linguistics; Thursday: Malay Socio- Culture, History; Friday: Malay Arts; Saturday: Research Guide and Malay Wisdoms; Sunday: Rest and Preparation of content.

However, there are times when the subject scheduled is not followed. This happened when the librarian unable to find a suitable content or more editing time needed to prepare the content. Whatever the situation is, the librarian is trying to have one post live on that day if possible.

Hashtags

Each posting is accompanied with hashtags for the purpose of internet discovery with search engines. However, the other objective of the hashtag is to give user basic information about the posting's theme. This is helpful when a quote derived from a middle of paragraphs. Although temporary title is given by putting square bracket symbol [temporary title], the admin is trying to minimize the practice in order to retain the originality of the extracted text). The hashtags that frequently used by the PPM FB are: #bahasamelayu, #sasteramelayu, #linguistikmelayu, #sosiobudayamelayu, #kesenianmelayu, #hikmah#panduan, #penyelidikan, #manuskripmelayu.

Content reaction

The reaction of user for a post depends on type of the content. For two lines Pantun of Tenas Effendy from his book tunjuk Ajar Melayu with nice graphic and fonts PPMFB could get a Like or share within or less than 15 minutes. However, a plain text of about 12 text lines on Pantun need more than 30 minutes to get a reaction. Even though no reaction acquired by the content could get more page reach and engagement. This means the post is being viewed and read passively by users. An image needs to have description to get more reactions. A mere photo may only get page reach. Whereas a photo image with Malay Studies Student s or known figures could get instant Like and Engagements. Based on the author observation the audience of PPMFB prefer plain text with Malay studies topics and image of Academy of Malay Studies surrounding. Both content mostly received Likes and more engagement. This shows that the audience of the Facebook page are the Academy community or has relation with it and University of Malaya.

Table 1: User Content preference

Period	Content Type	Description	Page Reach	Engagement	Rank	Rank (overall)
1st-30th April 2021	Newspaper cutting (image)	Utusan- Jikey dance	177	3	1st	1st
	Talk poster	DBP-Prof Asmah	122	4	2nd	3rd
	News Url Link	MSN-Sg -Batu	37	3	3rd	
	Plain Text		12	0	4th	
1st-31st May 2021	Image	PPM Library	148	4	1st	2nd
	Plain Text	Hari Raya Greeting	59	9	2nd	
	image	Library book-reshare	47	9	3rd	
	Image	Library Book	46	7	4th	
1st-31st June 2021	Plain Text	Quote- Prof Rahmah	106	18	1st	
	Text with graphic	Quote -Prof Muhd	100	9	2nd	

	Text with graphic	Quote-HAMKA	63	3	3rd	
	Plain Text	Prof Rahmah Passed Away	58	7	4th	

The Table 1 shows Newspaper cutting image had highest Page Reach (177) in the first month. But it received low Engagement score. The gap between Page Reach (177) and Engagement (3) was too wide by 174 points (177). This means Users Viewed and may read the content but only 3 of them found it relevant. In the following month, the image of new APM stairs ranked as the first, since it had 148 Page Reach, and 4 Engagement. However, in the third month, Plain text of quote by the late Prof Emeritus Dr Rahmah Bujang ranked as the 1st. It received 106 Page Reach and 18 Engagement, it acquired 3 times higher Engagement rate if compared to the Newspaper cutting in the first month. There were 12 contents analysed within the period. Seven (7) Images, four (4) Plain texts and one (1) url Link. Averagely Plain text received 0- 18, engagement whereas Image 3- 9. But, if we based on overall page reach rank, the image content type placed at all the top 3 ranks.

Based on this analysis, image content type is preferred by PPM Facebook users. Apparently, they always have option to choose but they opted to view the PPM content on their devices. even though the colour and graphic are appealing, it is still dependent about the content. If it is relevant, it might have more Engagement rate. In contrast, the strength of plain text content type is fully relied on the subject and its context because it does not have any other attraction factor as available in image.

SOURCES

Preparing a content in Facebook for users is a daunting task challenging task. A content provider must know its users and topic of interest or subject and the type of information needed to serve them right. This will give insight to determine the purpose of Facebook site. The clear objective helps to provide relevant content. Objective should be shared to users either as a title or page and it must be right and brief. Page title will give information to user at a glance. It could attract potential visitors to the site. In order to maintain the information for the Facebook posting, adequate resources must be available.

Malay studies Library (PPM) Facebook is a subject-specific content provider on Malay Studies. Relevant available resources are selected from the library as content. As a guide in selecting a resource, five (5) main division of subjects offered by the Academy of Malay Studies as basis of reference: 1) Malay Language, 2) Malay literature, 3) Malay Linguistics, 4) Malay Socio- culture, 5) Malay Arts. Users of PPM Facebook whose mainly students from the academy are familiar with the subject divisions. Other users may also be familiar with the division since they are common themes of Malay discourse.

The type of sources for content are derived from selected printed from open and closed stack collection of the library. Table 2 shows some of the titles and its relevant subject division. However, during MCO, whenever the Work from Home directive imposed on university staff. The constant supply of information from the library is affected.

Alternatives for this is by recycling previous posts, referring online sources and utilising available resource at librarian home.

Table2: Example of content sources of PPM Facebook.

No.	Subject	Sources	Hashtags
1	Malay Language	Wadiassofi Jaafar (2020). Kekalkan kecemerlangan Bahasa Melayu dalam pendidikan.Pelita Bahasa. 20(12). 6.	#bahasamelayu
2	Malay Literature	Abdullah Hussain. (2016). Kamus simpulan bahasa. (2nd. ed.). Kuala Lumpur: Dewan Bahasa dan	#sasteramelayu
3	Malay Linguistics	Faridah Nazir. (2015). Pengantar linguistik Bahasa Melayu. Selangor: Sasbadi	#linguistikmelayu
4	Malay Socio-Culture	Ahmad Zahiruddin Mohd Zabidi. (2020). Khurafat, tahyul & mistik di alam Melayu. Selangor: PTS Publishing House. p. 23.	#sosiobudaya
5	Malay Arts	Rahmah Bujang. (2008). Glosari keseniaan: Seni visual & seni persembahan. Kuala Lumpur: Universiti Malaya, Akademi Pengajian Melayu.	#kesenianmelayu
6	Research guide	Sivachandraliggam, Sundara Raja. Noraini Mohamed Hassan & Chong, W. L. (2016). Kaedah Penyelidikan dan Panduan Penulisan.Kuala Lumpur:Universiti Malaya	#panduanpenyelidikar
7.	Wisdoms	Tenas Effendy. (2004). Tunjuk ajar Melayu: Butir-butir Melayu Riau.Yogyakarta: Balai Kajian dan Pengembangan Budaya Melayu.	#hikmah

AUDIENCE

As 16th July 2021 PPM Facebook has 718 lifetime Page Likes from its audience. Those are the most engaged people to PPM Facebook. The group gender represented by 408 (57%) of man and 305 (43%) of woman. 38% are between the age of 25-34 years old followed by 12%, 35-44 and 5%, 55-54 years old. Most of the audience are from Kuala Lumpur City. Origin countries of the audience are Malaysia (664), Indonesia (22), Thailand (11), Singapore (6), Egypt (3), and Brunei (3). It has 724 Page Reach. The total number of people who follows the PPM Facebook news update are 752 followers.

PAGE PERFORMANCE

To evaluate the performance of PPM Facebook a three-month data of key performance metrics from 1st April to 31st July 2021 were analysed. The Facebook built- in Insight in Creator Studio module is used to get the performance overview. On the specified period the number of people who saw the PPM Facebook content or "People Reached" were 1,191 people. Whereas the number of people who gave reactions to the site were totalled as 624 "Engagement". While the number of clicks within post that led to destinations or experiences on or off Facebook are 16. The number of comments were 15. PPM Post earned 64 shares. Emotion reactions such as like, love , haha, wow, sad or angry on Posts had received 323 reactions. The Photo views got 25 click views. Within the 3 months period the site had 12 new followers.

TOOLS

Software

Tools are necessary to enhance its presentation and delivery. In general, tools can be divided into two categories. Software and hardware. Anything that posted in the Facebook may get audience response. But improving the look and presentation of the content could attract more audience to the posting. Software: Most of the time. Image taken from smartphone will be edited with this two software. First: The Samsung Gallery. It is a native image gallery app for Samsung smartphone. It is a great convenience to use the app because it has all needed functions for editing an image such as Transform: Rotate, Flip, Ratio, Perspective and Lasso.; Tone: Contrast, Saturation, Brightness an hue. To pursue creativity, there are several effects to choose for example Classic, Evegreen, Stardust and others. Most of the effect recolour the image automatically. Secondly, Snapseed is another Android based image editing software by Google. It has more advanced features than Samsung Gallery. It has 35 Tools, 11 image styles or effects and 38 text styles. For all of these good tools user can get Snapseed for free from Google Play Store. However, the app is text style function is frequently used, M6 and M8 text style are favourites.

To create textual image. The Pic Monkey app is applied. It is a commercial Android photo editing app. Although textual image could be created by the previous two apps but creating it, is a lot easier with Pic Monkey. It has more than 70 Sans Serif and Serif fonts range from Formal, fancy, futuristic and handwriting categories. It produces clean, sharp and crisp textual image.

Hardware

The most important tool to prepare a content and managing a Facebook is a smartphone. Smartphone with Large screen, powerful processor, high RAM, sufficient storage as well as stable network coverage is necessary. The smartphone that being used by PPM Facebook administrator is Samsung Galaxy Note 9. To manage a Facebook page, any smartphone is eligible. But, by author personal experience the mentioned smartphone has offered much convenience.

Due to its performance consistency quick charging, compatibility, screen size, and S-Pen. Since 2018, the Samsung Galaxy Note 9 is a close companion of PPM Facebook. It never caught with any problem. The 4000AMH battery capacity is adequate for one day use. Quick charging feature with type C port is outstanding. Facebook is battery drainer. Hence

a Power bank is necessary to get consistent power supply. So far, The Note 9 is compatible with most app installed from the Google Play store. But it is best to ensure only necessary app is installed to save a storage. The 6.4 inches screen size is eye convenience and enough to get around. S-Pen is an excellent feature of the smartphone. It enhances precision and accelerates a typing task to prepare a content.

CHALLENGES

The Malaysian government has put its efforts to control the spread of the COVID-19 virus in this country to ensure the well-being of its people. Movement Control Order (MCO) is one of the enforced measures. Besides of its effectiveness in curbing the virus widespread. MCO adding up to pre-existing challenges in managing the PPM Facebook page:

1.Network instability
Stable internet connection is one of key factors of the content delivery success. Whenever the MCO was launched caused slower internet speed because people remaining indoors all times and resulted unprecedented surge of bandwidth demand (Tee, 2020). This delays PPM Facebook posting.

2. Limited resources
With the compulsory instruction to work from home (WFH) from the top management of University Malaya, author no longer has access to the printed resources in the Malay Studies Library. Previously, author could just select and pick any information he desired. However, this obstacle has opened another door for improvement. It is crucial to have the collection online.

3. Interchanging Subjects
The Academy Malay studies Academy separates Malay language and Malay Linguistics as department so does the courses. People outside the field may face difficulty to differentiate between them. For example, in Malay language department. The study of about dialect is focussed on Malay ethnics dialects, Whereas in Malay linguistics it focuses on dialectology a branch of knowledge in linguistic. But sometimes author found these two subjects are discussed interchangeably. Careful reading is necessary to understand the context.

4. Motivation Ups and Downs
Maintaining a Facebook is a commitment. It is time consuming task. You need to find and select the right material. It involves a lot of work just for a single post for your audience. It is a repetitive step and could be tiresome. There are times you feel demotivated in doing this.Especially when you did not get the information that you plan to share. This may happen when your post did not get expected reaction from audience.

5. Less audience reactions
Since 2014 when the PPM Facebook was initiated. It receives less reaction such as Like, share and comment from audience. This probably due the nature of its content which mostly facts and textual. The objective of the Facebook itself is focussing to provide information on Malay Studies, facilitate learning and research in the field. The information

in the post is derived from existing authentic and reliable sources. The content which is mainly academic may not that attractive. Thus, casual user may feel the content is not suitable for him. Even though the site does not get much attention its fan is gradually growing yearly.

DISCUSSION AND RECOMMENDATION

In general, The PPM Facebook has positioned itself as a source of information in Malay Studies. How significant and relevant this contribution to the users probably can be reflected from the retrieved performance data. Out from 754 followers, PPM Facebook get 624 Engagement such as Likes, Comments and share within 3 months period. In other words, approximately 82% of the followers have shown their commitment to the PPM Facebook. This percentage indicated the Facebook has some significance and contribution to its followers. Therefore, it is important to continue and to do necessary improvement to the content to increase engagement from the users.

As long as the pandemic is not over library users will continue to use online resources. For this reason, more resource on Malay Studies should be made accessible available online in any platform now and in the future.

CONCLUSION

The presence of social media platform in these trying times is crucial. It is to enable users communicate their information needs to the library. This channel will help library to understand the required information. Furthermore, library itself is using the platform to feed users with relevant information. To ensure this relation workable, librarian must be actively presence in the platform. The sense of responsibility to help users on this matter could be realized by mobilizing the existing social media platforms for that purpose. In the case of the Malay Studies Library. Facebook is one of the solutions. After all this is the struggle of the library in fulfilling its user information needs.

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Research Trend of Horticulture Department, Assam Agricultural University, Jorhat, India during 1987-2020: A Bibliometric Analysis

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ABSTRACT
This paper provides the publication trends of Horticulture Departments under Assam Agricultural University during the year 1987-2020 that are indexed in Scopus database. This study mainly brings into focus on the year-wise investigation results, types of documents, authorship pattern, top ten journals, and highly cited papers of AAU. It is found that 74 papers received 765 citations published from the Horticulture Department during the year 1987- 2020. Departments of Horticulture under AAU, Jorhat preferred to publish their work in joint authorship mode. The maximal number of papers 15 (20.27) were published in Annals of Biology. Occurrences of keywords were determined using VOSviewer software.

Keywords: Horticulture; Horticultural sciences; Bibliometrics; Research productivity; Assam Agricultural University; VOSviewer

INTRODUCTION

Horticulture is the science, art, and practice of cultivating garden crops, mainly fruits, vegetables, and ornamental plants. The word "horticulture" is derived from the Latin word "hortus" mean "garden," and "cultura" mean "to cultivate" (Wikipedia, 2021). Assam Agricultural University, Jorhat is agricultural research university established in Jorhat, imparting education in agriculture and allied fields and also involve in conducting research. AAU, Jorhat incorporated 52 years ago on 1st April 1969. The Horticulture Department of AAU is one of the oldest departments. The Department of Horticulture was established in 1948 as a part of Assam Agricultural College (aau.ac.in, 2021). The current study focuses on the scientific contributions made by the faculty members of the Department during the period 1987-2020.

LITERATURE REVIEW

Deepthi and Tadasad (2019) noticed that collaboration among the researchers of

University of Agricultural Sciences, Dharwad within the same departments is dominant in cooperation other nature of collaborations. Department of Plant Pathology shows maximal number of collaborated articles. A study by (Manzano, Cardenas and Agugliaro, 2020) identifies that the worldwide contribution on medicinal plants is concentrating more on exploring novel medicines or active compounds. Analysis reveals that Pharmacology, Toxicology and Pharmaceutics category accounts 27.1 % of the whole publications and only 11% of publications are categorized under Agricultural and Biological Sciences subject. Nagarkar, Veer and Kumbhar 2015) using WoS database found that productivity of faculty members of life sciences departments under Savitribai Phule Pune University shows steadiness in growth rate of publications. Majority of paper were published in Biology. The faculties published their research results in journals having an Impact Factor of one or more. (Ng, Mustaffa and John, 2019) examined the output of specialized young university less than 50 years old in Malaysia by assessing impact of co-authorship in the discipline of science, technology, engineering and mathematics internationally. The results showed that faculty members of the university mostly collaborated with researchers from Asian institutions. Annual citation per article (Cpp) indicated that joint effort with European countries researcher's present highest impact for the mean Cpp. (Pradhan and Ramesh, 2017) **a**nalyzed the research production of Engineering Sciences branch of Indian Institute of Technology Madras and Bombay appeared in Scopus. Both IITs prefer to publish their research output in journals published from the Western countries such as USA, UK and Germany etc. Different bibliometric indicators were used such as Total Number of Publications (TNP); Total Number of Citations (TNC); Citations per Paper (CPP); and Relative Citation Impact (RCI) to assess the research performance. Scientists of both the IITs published maximal in the area of material science. (Bansal, Bansal, Saini and Gupta, 2015) analyzed the growth and the contribution of research explored by the faculty members of Mathematics discipline of Panjab University. A total number of 230 research paper were indexed in Scopus for the period of ten years (2005-14). The results reveal that publications have increased at an average growth rate of 17.15% annually and average citation impact per paper of 2.92 and impact factor per paper of 0.89. Majority of publications (35.96%) were the result of national collaboration during 2005 - 14 and highest number of papers were published in algebra with 28.7% of total share.

THE OBJECTIVES OF THIS RESEARCH ARE TO:

i. Assess the research output of the Horticulture Department, AAU, Jorhat;
ii. Examine the distribution of papers;
iii. Analyze the authorship pattern;
iv. Evaluate the most cited journals during the period under study;
v. Find out the most highly cited papers;
vi. Analyze keyword co-occurrence.

METHODOLOGY

This study is aimed to make bibliometric analysis of the research publications of Horticulture Department of Assam Agricultural University, Silchar which are index in Scopus database. The research data was collected from Scopus database on 22nd February

2021 by using the "Affiliation search" "Assam Agricultural University India" and then limit the department to Horticulture Department manually (www.scopus.com, 2021). A total of 74 papers were downloaded and then the collected data were scrutinized with the help of MS- Excel. VoSViewer software tools were employed to create a keyword co-occurrence map based on the retrieved bibliographic data.

RESULTS AND DISCUSSION

(a) Year-wise productivity and citations

Table 1 shows that the number of publications produced by AAU in horticulture consists of 74 papers during 1987-2020 and highest number of papers was published in 2017 with 9 papers. During the period of the study, a total of 765 citation were received by 74 publication.

Table 1: Year-wise productivity and citations

Year-wise productivity and citations				
Sl.no	**Publication Years**	**Records**	**%**	**TC**
1	1987	2	2.70	39
2	1997	3	4.05	2
3	1998	2	2.70	3
4	1999	2	2.70	8
5	2000	1	1.35	0
6	2001	1	1.35	18
7	2002	1	1.35	5
8	2003	1	1.35	244
9	2004	2	2.70	7
10	2005	2	2.70	3
11	2006	3	4.05	290
12	2007	1	1.35	0
13	2008	4	5.41	55
14	2009	3	4.05	14
15	2010	6	8.11	44
16	2011	1	1.35	7
17	2012	3	4.05	0
18	2013	1	1.35	1
19	2014	4	5.41	5
20	2015	6	8.11	6
21	2016	8	10.81	4
22	2017	9	12.16	3
23	2018	3	4.05	6
24	2019	3	4.05	1

25	2020	2	2.70	0
Total		**74**	**100**	**765**

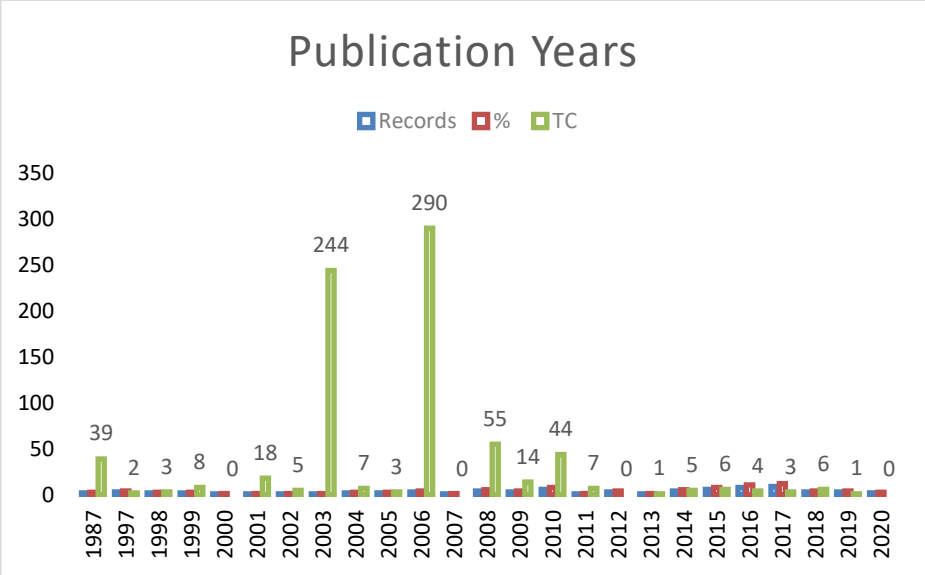

Figure 1: Publication Years

(b) Distribution of papers by types of document

The type of publications or mode of communication of research contribution of horticulture department under AAU, Jorhat during 1987-2020 are listed in Table 2. Of the 74 publication, 90.54% (67) appeared as articles, 5.41% (4) as review papers, 4.05% (3) as conference paper.

Table 2: Types of Document

Sl. No.	Publications Forms	Records	Percentage
1	Article	67	90.54
2	Review	4	5.41
3	Conference Paper	3	4.05
Total		**74**	**100.00**

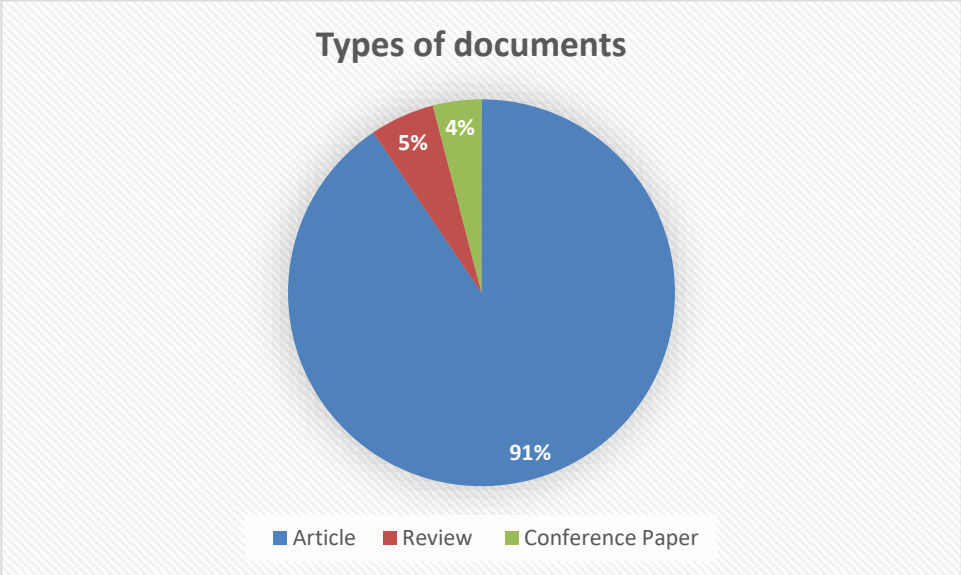

Figure 2: Types of Documents

(c) Authorship pattern

Table 3 shows authorship pattern that reveals that majority of Faculty members of Horticulture Department, AAU Jorhat preferred to publish the research results in joint authorship mode than single authorship. This shows that researchers tend to publish their research work with three and four authors.

Table 3: Authorship pattern

Sl. No	No. of Authors	No. of papers	Percentage (%)
1	Single Author	3	4.05
2	Two Authors	14	18.92
3	Three Authors	27	36.49
4	Four Authors	21	28.38
5	Five Authors and more	9	12.16
Total		**74**	**100**

(d) Top ten Journals

Journals are considered as one of the prime sources of information which are preferred by researchers to disseminate their research results. A list of top 10 journals which were found to be most productive, publishing 3 and more papers are given in Table 4. The maximal number of papers (19) were appeared in Annals of Biology, followed by Asian Agri-History, etc.

Table 4: Distribution of Journals

Rank	Journals	No. of Records (n=74)	Percent (%)	Cumulative No. of Articles	Cumulative Percentage (%)
1	Annals of Biology	15	20.27	15	20.27
2	Asian Agri-History	13	17.57	28	37.84
3	Biopesticides International	13	17.57	41	55.41
4	Current Science	10	13.51	51	68.92
5	Ecology, Environment and Conservation	9	12.16	60	81.08
6	Food Chemistry	7	9.46	67	90.54
7	5 Journals with 2 papers each	4	5.41	71	95.95
8	13 Journals with 1 paper each	3	4.05	74	100
Total		**74**	**100**		

(e) Highly cited paper

7 papers of Horticulture Department, AAU Jorhat received 10 and more than 10 citations. Table 5 listed the top 7 papers in descending order. The paper authored by B.N. Hazarika received highest number of citations i.e. 287 and the paper was included in "Scientia Horticulturae" in 2006.

Table 5: Highly cited paper

Rank	Title of the paper	Authors	Source title	Publication Year	Times Cited
1	Morpho-physiological disorders in in vitro culture of plants	Hazarika B.N.	Scientia Horticulturae	2006	287
2	Acclimatization of tissue-cultured plants	Hazarika B.N.	Current Science	2003	244
3	Antibacterial activity of the crude extract of Chinese green tea (Camellia sinensis) on Listeria monocytogenes	Mbata T.I., Debiao L.U., Saikia A.	African Journal of Biotechnology	2008	50
4	Control of post-harvest pericarp browning of litchi (Litchi Chinensis Sonn)	Neog M., Saikia L.	Journal of Food Science and Technology	2010	31
5	Changes in chemical composition of the kew	Kermasha S., Barthakur	Journal of the Science of	1987	29

	cultivar of pineapple fruit during development	N.N., Alli I., Mohan N.K.	Food and Agriculture		
6	Application of mixtures methodology for beverages from mixed fruit juice/pulp	Deka B.C., Sethi V., Parsad R., Batra P.K.	Journal of Food Science and Technology	2001	18
7	Chemical composition and proposed use of two semi-wild tropical fruits	Kermasha S., Barthakur N.N., Mohan N.K., Arnold N.P.	Food Chemistry	1987	10

(f) Analysis Co-occurrence of Keywords

VOSviewer is a software which create maps based on visualization of similarities in terms of co-occurrence of authorship, keywords, citation etc. (Jan van Eck & Waltman, 2010). This software tool used bibliographic data available from four different databases (Scopus, Web of Science, Dimensions and PubMed) to construct a network (https://www.vosviewer.com/, 2021). VOSviewer (version 1.6.16) was used for visualizing the co-occurrence of all keywords (author keywords and index keywords) for the current study. The top 5 keywords appeared in the visualization map were banana (8) followed by yield (7), India (5), Assam (5) and lycopersicon esculentum (5). The results are presented in Fig. 3.

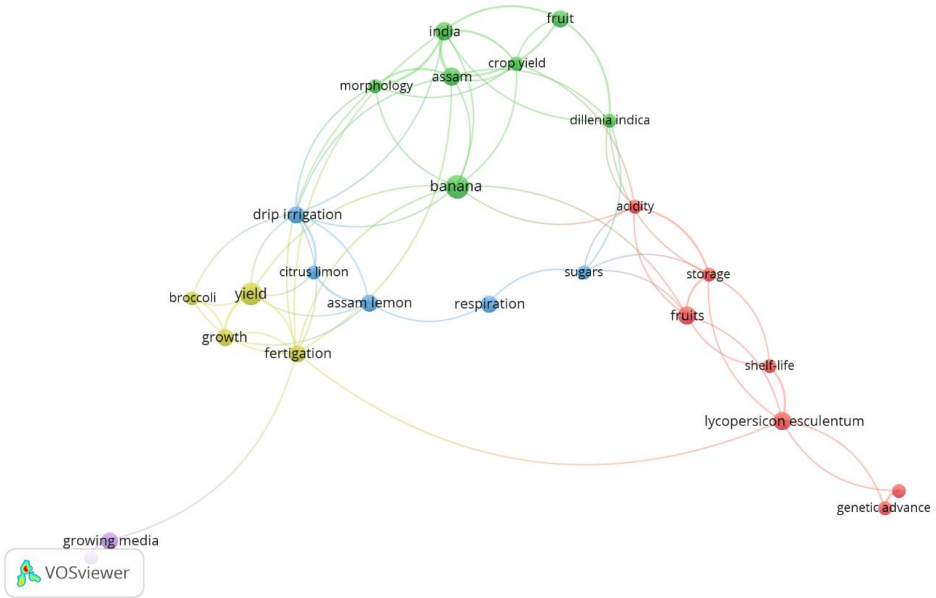

Figure 3: Frequently occurred keywords

CONCLUSION

Horticulture focuses on fruit, vegetables, ornamental flowers, and many more, instead of staple food or crops (https://web.archive.org, 2021). Horticultural research improves

health and quality of life for the world at large. Horticulture signifies health. The factors of good health for the people of the nation based on the production, consumption of horticultural products (http://nhb.gov.in, 2021). Horticultural research became one the vital field of study in the last few decades. Several bibliometric studies have been conducted to distinct disciplines. Based on the bibliographic data appeared Scopus, this study highlights the research productivity of Horticulture Departments of AAU, Jorhat. shows that the researchers are very active in their research investigation. The major findings manifest a trend of growth in publications associated with horticulture productivity. According to the findings, 74 papers received a total of 765 citations. Only 4.05 % of paper contributed by single author. Annals of Biology published the most articles (20.27 per cent), followed by Asian Agri-History (17.57 per cent). The utmost citations were received by "Morpho-physiological disorders in in vitro culture of plants" by B. N. Hazarika which was published in "Scientia Horticulturae" in 2007. VOSViewer was also employed to construct a map of frequently occurring keywords.

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Teaching Information Literacy Skills During the COVID-19 Pandemic: A Case Study of T.J. Danaraj Medical Library

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ABSTRACT
Due to the COVID-19 pandemic, online learning, blended or hybrid provision has become the "new normal" in higher education. A new mission is emerging for academic librarians involved in the delivery of information skills sessions, addressing access and connectivity to resources, designing for online education and fostering student digital literacy development. This is an observational study based on the medical librarians' personal experiences and subjective opinions. This paper shows how the medical library changed their practices in enhancing the library skills during the COVID-19 emergency as to provide user-friendly services, researcher support tailored needs as well as to impart knowledge on information literacy (IL) to undergraduates and postgraduates during the pandemic. This paper also highlights the areas of importance for the design and direction of information literacy post pandemic. The evaluation method such as pre and post-test and usage statistics, are used in this study to evaluate the impact of each information skill session. The findings show that there is positive feedback from the undergraduates towards the courses and the level of knowledge of the postgraduates regarding library skill improved after the information skill sessions. There are new norms of interacting with students via Telegram and WhatsApp. In conclusion, this is a part of a new series in this regular feature regarding trends in the provision of information by health science libraries. By sharing expertise and drawing together relevant trends the series intends to serve as a road map for both health science librarians and health informatics professionals.

Keywords: Information literacy; Observation paper; Medical libraries; Academic libraries; Health sciences librarians.

INTRODUCTION

The pandemic has taken the world by storm and the unprecedented health crisis brought on by the coronavirus has disrupted the entire world. As many countries moved into varying degrees of lockdown in 2020, the higher learning institutions were forced to close and work remotely while events were canceled to limit the spread. Malaysia too had imposed the Movement Control Order and initially, it was for two weeks but was further extended for several months with different levels of movement control to minimize the risk of the outbreak.

Since face-to-face contact is not possible, universities and colleges had to resort to providing lessons virtually in full force. Before the pandemic, most higher learning institutions have started to implement a blended learning approach where both online and in-person learning experience when teaching students is practiced. However, when the regular academic methods are disrupted, online instruction appears to be the only feasible option to support teaching, learning, and research. Even though many are ill-prepared and not adequately trained, they had to adapt to new working conditions as a response to the crisis.

Martzoukou et al. (2020) said that the pandemic has created a slew of complex and ongoing challenges in higher education, including the implementation of remote tools and practices in online teaching and learning in a way that ensures accessibility and equity for all, issues related to online pedagogy, and how to prepare students with the information and digital literacy competencies required for the new online environment. COVID-19 has turned institutional fear of online learning into something eminently feasible. This will be enormously empowering for the university. Therefore, the objective of this article is to study the impact of each information skill session by conducting pre and post-test and usage statistics.

Library's Information literacy programme at T.J. Danaraj Medical Library

Since 1998, the University of Malaya Library (UML) has made it compulsory for all undergraduate students to sign up for the Information Skills Course (GXEX1401). It is a one-credit-hour course with a 14 hours lecture at the computer lab with internet access (Edzan N.N. 2012). Over the years, this course has been revamped to include a blended learning approach. It consists of web-based technology (online assignments, video, slide, online test), pedagogical approach with group discussion, and instructional technology with face-to-face training led by librarians. Under the course code GIG1004, it is one of the University's core courses and students must pass this course to fulfill the degree requirement [University of Malaya (First Degree Studies) Rules 2019 University of Malaya (First Degree Studies) Regulations 2019: Part VI: Structure of Programme of Study, Course Components and Schedule A, Regulation 7(1) Requirements for Graduation].

This course is designed to give students the skills they need to find information on their own using the Library's IT system. The skills obtained can be applied not only on campus but also in other areas of lifelong learning. Students are trained and guided on using the computer and IT systems such as Pendeta Discovery (Library Catalogue), Online Databases, and the Internet to search for information. This course will also develop student information management skills and become effective and efficient users of information. These essential skills will contribute to academic success as well as create a foundation for lifelong learning. Therefore, this course focuses on the strategic use of information and references sources in various formats. Evaluation of information gained, and the preparation of a reference list is also emphasized.

The postgraduates consist of Masters and Ph.D. candidates recommended to attend the Information Skills Session for two hours. During these sessions, library resources related to health sciences were highlighted, and different methods of searching were shown to the students. The postgraduates were also taught how to use EndNote, the reference

management software to manage bibliographies and references when writing reports and articles, and Turnitin, a tool to help prevent plagiarism. The Information skill session is a special session for postgraduate students in the three faculties. Unlike the GIG 1004 class, this session is not a compulsory class to attend. However, this session is available throughout the semester. The class is designed to equip postgraduate students with research skills that will help them to search for information independently using library services and facilities. It divulges the systematic ways to search for a scholarly article using library platforms. Some of the online services including inter-library loans, document delivery service, and plagiarism checker were elucidated during the class. The class also teaches the student how to manage references by using EndNote software. Some of the important tips on managing references by regrouping the citation and cites as they write were demonstrated during the class. The library also offers a systematic review session for those who are conducting systematic review research. The librarian will teach them how to develop search strategies and be used as a search statement. They also introduce several related databases and platforms to be used when conducting a comprehensive systematic review study. The last module that is included in the information skill session is the literature review class. This class equips students on how to write a proper structure of the literature review by also referring to the basic references in the library. The librarian will explain to the students how to use subject dictionaries, thesaurus, almanacs, and many more. The element of the information in those references will help the students to create a persuasive writing style in their literature review.

In recent years, many faculties have added Research Methodology as a mandatory induction course to introduce postgraduate research, make use of and evaluate a variety of research tools and methodologies.

A team of researchers and a librarian created the Literature Search (http://acord.my/RLOs/literature-search) reusable learning object (RLO) in early 2020 to support eLearning and teach students how to search for literature to answer clinical and healthcare-related questions. It is a practical and interactive open-access online resource in which students are first presented with a clinical scenario to activate their learning; then guided with images, demonstration videos, quizzes, and interactive activities to facilitate their learning of literature searching concepts and skills; and finally, apply the knowledge gained to search for the answer to the clinical scenario in a medical literature database.

In the first phase of this project, a survey of University of Malaya (UM) students and lecturers was conducted to identify the topics to develop into RLOs, and a literature search emerged as one of the top topics chosen. To begin with, librarians and evidence-based medicine experts who teach literature search subjects were gathered to contribute to the content of this RLO, which aims to teach students how to search for literature to answer clinical and healthcare-related questions. Following the ASPIRE RLO development framework, the storyboard was created, the specifications were filled out, and the prototype was reviewed by a medical student, an evidence-based medicine expert, and an eLearning expert before it was released for use in teaching.

At T.J. Danaraj Medical Library, a library component was included in these programmes and the librarians are invited to give talks on library skills during the scheduled slot to health sciences students. The paper aims to highlight various approaches undertaken to

impart knowledge on information literacy (IL) to health sciences undergraduates and postgraduates (from the Faculty of Medicine, Dentistry, and Pharmacy) during the pandemic and to highlight areas of importance for the design and direction of information literacy post-pandemic.

LITERATURE REVIEW

Academic libraries are critical to their institutions' teaching, learning, and research activities. The libraries exist to enable and enhance learning in all of its forms, whether it is the learning of a first-year undergraduate grappling with the meaning of higher education or the learning of a Nobel Laureate seeking to push the boundaries of her discipline (Brophy 2005). While the services and facilities were once designed with library operations and service delivery taking precedence over pedagogy, this is no longer the case (Bennett 2015), and, as a profession, the librarians have been complicit in being labelled as "non-academics" and accepting their roles as "supporting" learning. However, in today's digital environment, it is becoming increasingly clear that libraries and librarians have a significant role to play in learning and teaching in a rapidly changing global higher education sector. For decades, learning and teaching have been central to academic libraries' mission (Aldrich 2007; Bangert 1997; Wadas 2017). However, the way libraries fulfil their educational responsibilities is constantly changing in response to changes in pedagogy, technology, the economy, society, and their parent institutions' policies and strategies. Case studies of new and improved library practices have also resulted from advancements in information literacy, instructional design, peer-assisted learning, and open educational resources (Godbey, Wainscott, and Goodman 2017; Jacobson and Mackey 2017; Rinto, Watts, and Mitola 2017; Walz, Salem Jr, and Jensen 2016).

Lambert (2020) had suggested that during COVID-19, higher education institutions discovered that the technology exists at scale and in affordable forms to support high-quality online learning, and few methodologies are simple enough for their faculty to follow. There is live (synchronous) learning, recorded (asynchronous) learning, and numerous hybrids of the two. Zhao (2019) suggested that entry-level postgraduate students required additional information literacy training, possibly through an information literacy credit course or intensive one-on-one instructions that increases collaboration between libraries and faculties to integrate effective library-led information literacy into graduate course instruction would greatly benefit graduate students research and overall academic performance.

Information Literacy

The Association of College and Research Libraries defines information literacy as "the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning (Association of College and Research Libraries 2015). Information literacy (IL) is a set of seven skills: identifying (recognize information need), scoping (distinguish ways of addressing information gap), planning (create strategies for locating information), gathering (locate and access information), and assessing (compare and evaluate

information), managing (organizing, applying, and communicating information) and presenting (synthesizing and creating information) (Bent, Stubbings, and Sconul 2011). An information literate person, according to CILIP, is one who understands the need for information, the resources available, how to find information, the need to evaluate results, how to work with or exploit results, ethics and responsibility of use, how to communicate or share one's findings, and how to manage the findings (Chartered Institute of Library and Information Professionals (CILIP) 2004). This means that an information literate person can identify, access, locate, use, and communicate information in/via computer systems, traditional libraries, tools or technological machines, networked structures, the Internet, and graphic media. This can be further defined as a person's, in this case, a student's, ability to effectively use computer systems, libraries, electronic gadgets, the Internet, printed and published resources to determine, find, assess, arrange, use, and communicate information in both formal and informal settings. It is a set of skills that transforms students into lifelong learners. However, information literacy skills must be supplemented with a solid understanding of how information systems work, as well as an understanding of the various information sources and/or channels for meeting specific information needs.

Information Literacy initiatives

It is one of the core services of academic librarians to promote information literacy among students and staff in the university. Information literacy skills are foundation knowledge in any discipline and level of education. Previous experts including Chanchinmawia and Verma (2018) and Thanuskodi and Practice (2019) believed that information literacy is an essential skill for lifelong learning. Information literacy skills enable students and staff to master certain disciplines. Information literacy skills help students and staff to be more self-directed to access information and empowers students to be more confident to seek information (Thanuskodi and Practice 2019; Saptasari et al. 2019). The programme is designed to help students and staff in the university to be able to evaluate, search, use and create accurate information. The information literacy session has become a core activity in most of the academic libraries in the university. The module of information literacy is designed according to the courses offered in the university. The information literacy module for undergraduates and postgraduates is a design based on the information that the students usually need. In Taylor University Malaysia, there are five options of classes to choose including 1) route to resources, 2) down with databases, 3) research 101, 4) evaluating resources, and 5) cite it right (Taylor's Education Group 2021). According to Lela Ruzma Mohd Shaari, Harith Faruqi Sidek, and Saizimah Badzri (2012), a different information literacy initiative approached taken from the UKM library, whereby there is special library talk to new academic staff, and new students both undergraduates and postgraduates. Some universities design a special module for postgraduates, for example, Universiti Teknologi Malaysia Library provides a thesis writing class for their postgraduates. The librarian has also been asked to provide intellectual property training as part of the information literacy initiative (Dimitrova, Zdravkova, and Planska-Simeonova 2020).

The pandemic COVID-19 has transformed the information literacy initiatives in the university conducted in fully digital. Before the pandemic COVID-19, most of the literacy initiatives were conducted face-to-face or hybrid. The new norm of teaching and learning during this pandemic has forced librarians to be fully available online or in digital format.

Today during the pandemic, online learning is the most effective platform to engage with the students and staff. The sessions were conducted via Google Meet, Zoom, teams, and many more. However, librarians and students today face an invasion of information resources daily, as well as the challenge of utilizing these resources effectively and responsibly. The self-directed search for information also contributes to information overload among students in the university (Chanchinmawia and Verma 2018). Therefore, it is important to measure the effectiveness of the literacy initiative programmes in the library. The research finding will help librarians to identify the strength and weaknesses of the literacy initiative. The assessment helps the librarian to understand students' needs and what areas to focus on (Lwehabura 2018), (Okeji et al. 2020). There are several methods adopted by most of the librarians to measure the effectiveness of their literacy initiative. Surveys and interviews are the most frequently used to measure the success of the initiatives. Some librarians refer to the established guideline including Association of College & Research Libraries (ACRL) to prepare the measurement (Emmett and Emde 2007).

METHODOLOGY

There are various methods used to measure the impact of the literacy classes in this study. They are the pre and post-test questions, and page view statistics approach. Participants were health sciences undergraduate, postgraduate students, researchers, and academic staff of the Faculty of Medicine, Dentistry, and Pharmacy. This study was conducted from March 2020 till February 2021 in the Faculty of Medicine, University of Malaya. The methods used to measure the impact of the classes for undergraduate and postgraduates are as follows:

Undergraduate students

The evaluation for the undergraduate literacy classes is using pre and post-tests to test their knowledge. The course and course facilitators used Course and Teaching Evaluation System CTES.

Postgraduates students

a. The Information Literacy and Research Methodology Sessions

Information Literacy and Research Methodology sessions consist of the Systematic Review Search, Endnote, Online Databases, and Introduction to Library. Therefore, the impact of these sessions has used the pre and post-test questions. Participants were given 10 minutes to complete a few questions before and after the session.

b. Reusable Learning Object (RLO)

The ASPIRE framework's final component is 'evaluation.' When implementing eLearning resources, evaluation is an important step to take so that the eLearning resource can be improved continuously to maximize its impact on students.

The evaluation plan includes the following components: 1) an assessment of pre-and-post-RLO using knowledge and confidence; 2) a feedback survey, and 3) usage analytics using Google Analytics (GA) to measure user profile and number; user acquisition and user behavior. There are five pre and post-questions to measure the impact of their knowledge before and after using the RLO.

c. Medicine Libguides

During the pandemic, three Libguides pages were created and designed to assist the medical students and researchers to help them to find resources related to Medicine. These Libguides were used in teaching as an example of resources and platforms on how they can apply the resources in their studies and research.

Firstly, the Libguides: Medicine https://umlibguides.um.edu.my/medicine that contains lists of information sources to help answer the questions. Each consisted of the best sources for finding articles and facts for topics of interest to faculty, students, clinicians, and other researchers. Under this, the Dean of the Faculty of Medicine has also suggested providing a page to support remote teaching and learning in medical education, including open-access resources and several online resources from the library collection. Therefore, the Medical Education Remote Teaching Resources have been created.
Secondly, the COVID-19: Clinical Ethics Resources for Healthcare Professionals, Bioethics & Academics https://umlibguides.um.edu.my/covid19ethics provides a compilation of resources on clinical ethics of COVID-19. Its goal is to help healthcare professionals make decisions about pandemic patients. It is a Malaysian initiative coordinated by Clinical Ethics Malaysia (CEM). CEM is made up of an independent team of experts from various healthcare and higher education institutions in Malaysia, including clinical ethics.

Thirdly, the COVID-19 Evidence Retrieval Services (CERS) is a platform designed to help clinicians by retrieving the best available evidence on COVID-19 https://umlibguides.um.edu.my/covid19. A team of evidence-based medicine experts, librarians, doctors, and medical students provide this service. This guide was used to share the medical students on evidence-based practice. It also provides resources and information on the outbreak of coronavirus (COVID-19) for students, researchers, and clinicians at the University of Malaya. The page view for all the pages has been captured from January 2020 till April 2021.

RESULTS AND DISCUSSION

The pandemic COVID-19 had to change the way classes were conducted in the library. Previously most of the classes were conducted in physical class where there is a special lab provided by the faculty for the GIG 1004 information literacy class for undergraduates. Similarly, information skill class is also conducted face-to-face in the T. J. Danaraj Library's computer lab. Some researchers also prefer to make an appointment to meet the librarian personally if they need special information skills consultation with the librarians. The pandemic had forced teaching and learning sessions to be conducted virtually. Undergraduate student's course outlines, notes, quizzes, and tests were posted and conducted via UM SPECTRUM. The class was conducted via several platforms including, Google Meet, Microsoft Team, and Zoom. The same platform was used to conduct

information skill sessions for postgraduate's students. The Endnote, literature review, and information skills class were conducted virtually via those platforms.

Facilitators were given the option of conducting three live classes using any platform they are familiar with, such as Google Meets, Microsoft Teams, WebEx, Skype, and others. Some facilitators created a WhatsApp and Telegram group to help with communication throughout the semester. Students can also contact their facilitators through the message and forum functions of UM Spectrum, as well as UMMail.

The outcome evaluation of the literacy classes for undergraduates

A total of 174 medical students and 50 dental students were involved during course evaluation for the GIG1004 Information Literacy Class. Six criteria were analysed including the relevance of the programme of study, three-question related to course content, knowledge enhancement, and intellectual skills. The assessment measured the satisfaction towards the course. Five Likert scales were adopted namely; strongly not agree, not agree, natural, agree and strongly agree. Figure 1 shows the research finding on the course evaluation.

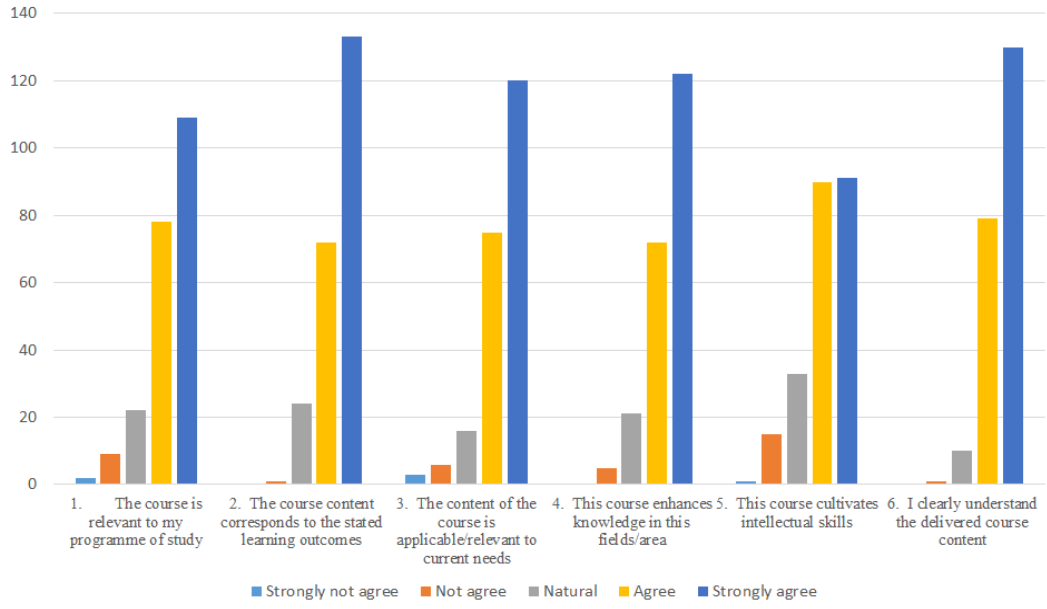


Figure 1: GIG1004 course evaluation

A total of 222 students were involved in the course evaluation. The students were asked to specify the level of agreement towards given statements in the survey. Eventhough the class was fully conducted in the online format, most of the students still find that the course is relevant to their programme of study. The method of class does affect the student to identify the importance of the course. Besides that, the students also agreed that the course content corresponds to the stated learning outcomes. Moreover, the online class didn't affect their understanding of the applicability of the information literacy class towards their current needs. The student also on the other hand,

unanimously agreed that this course enhances their knowledge (class A 52%, class B 53%, class C 67%, class D 60 %, class E 49%, and class F 72%). The positive feedback was also recorded for question number five. Most of the students choose to agree and strongly agree to the statement whereby the course cultivates their intellectual skills. For the last question, the students were asked whether they understand the delivery of the course content. The finding shows that the students unanimously understood the delivered course content without any problems. It shows that undergraduates students didn't face any major problem studying in online method due to the pandemic COVID-19. Other studies also found that there are no negative impacts using online learning on the students' performances and no significant difference in gained theoretical knowledge between these students (Franklin et al. 2021; Muthuprasad et al. 2021; Kratochvíl 2014).

The outcome of the literacy classes for postgraduates

Besides undergraduate students, this study also measures the feedback from the postgraduate students in the faculty. A total number of 66 postgraduate students registered for the information skill session during the pandemic. There are three main information skill classes offered to postgraduate students, namely Endnote and APA 7th class, Information literacy programme (library website, Pendeta Discovery, and A-Z databases), and Literature review class. Students who attended the class were required to complete the before and after feedback forms. Figure 2 shows the average research finding before and after attending the course. It shows that there is a sign of an increase in terms of knowledge after attending the courses. The results show that online class does not affect postgraduate students to understand each of the courses offered by the librarians.

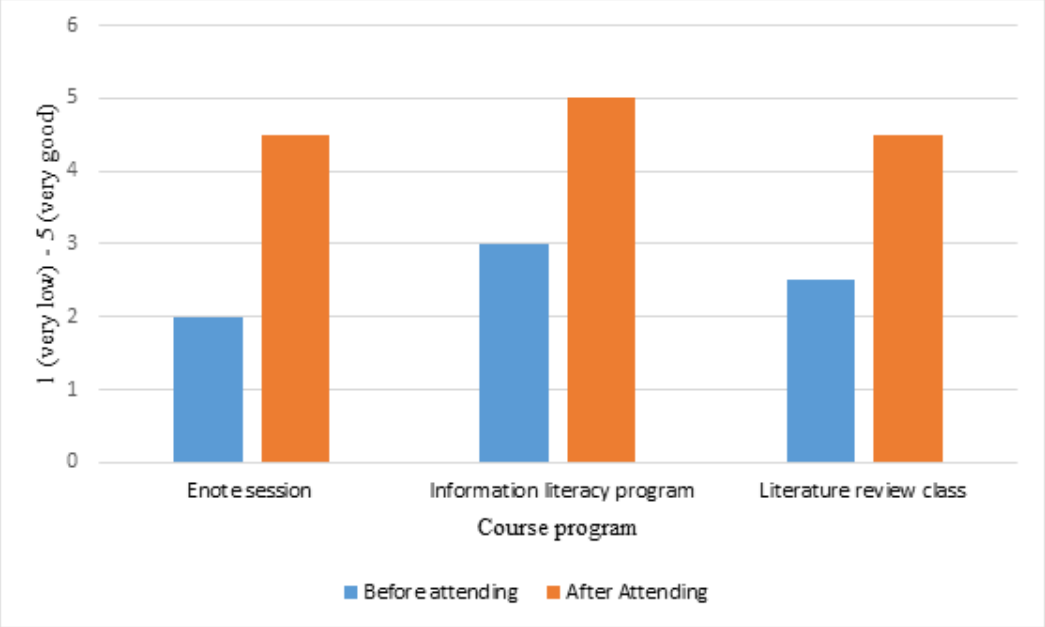


Figure 2: Course evaluation before and after attending the Information skill session namely, Endnote session, information literacy programme and literature review class.

This study also examined students' ability to use Endnote software, the ability to import and export citations into Endnote, the ability to cite while writing, and the ability to

understand the latest APA citation style, APA 7th edition. The research finding is presented in Figure 3.

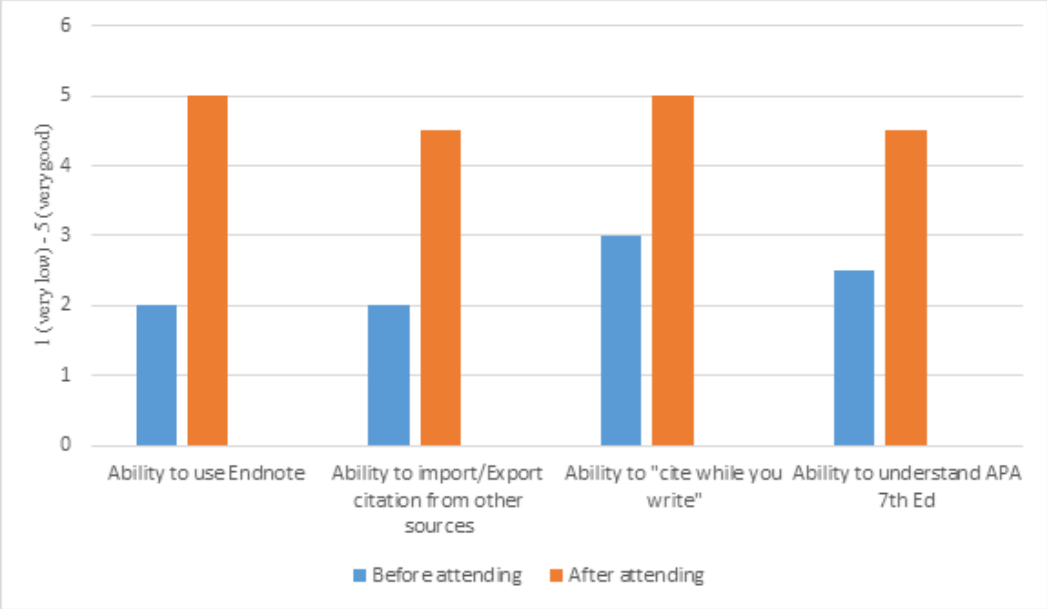


Figure 3: Course evaluation before and after attending the Endnote class

The finding presented in Figure 3 shows that, on average, most postgraduate students can understand the Endnote session. Even though the class involves third-party software and some technical process, the online class does not stop postgraduate students from gaining their knowledge on Endnote and citation style. The finding clearly shows that online class does not affect undergraduate and postgraduate students to comprehend the courses.

The outcome of the Research Methodology Classes for postgraduates

A short survey was distributed before and after the Research Methodology class which was attended by 42 students. It briefly tested respondents' knowledge pre and post session including several questions on the effectiveness, usefulness, facilitators' presentation and the preferred method of delivery.

When asked what was used to search for printed books available in the library collection, Figure 4 shows that this knowledge doubled after attending the session.

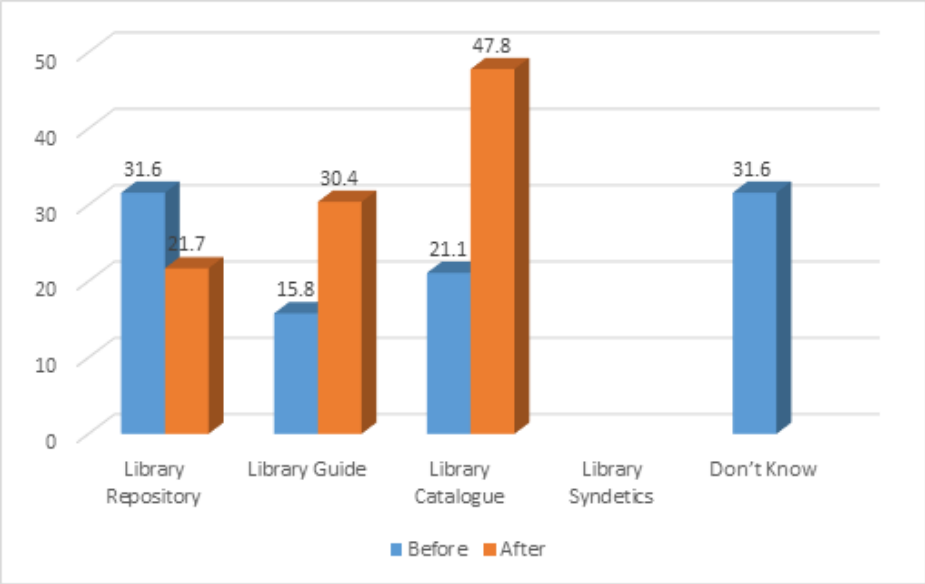


Figure 4: Pre and post questions regarding library tools

Students were then asked to name medical databases that they are familiar with. Initially, most of the students mentioned that they have heard of Cochrane and EMBASE as displayed in Figure 5. Post-session showed that there was an increase in databases such as OVID and ProQuest.

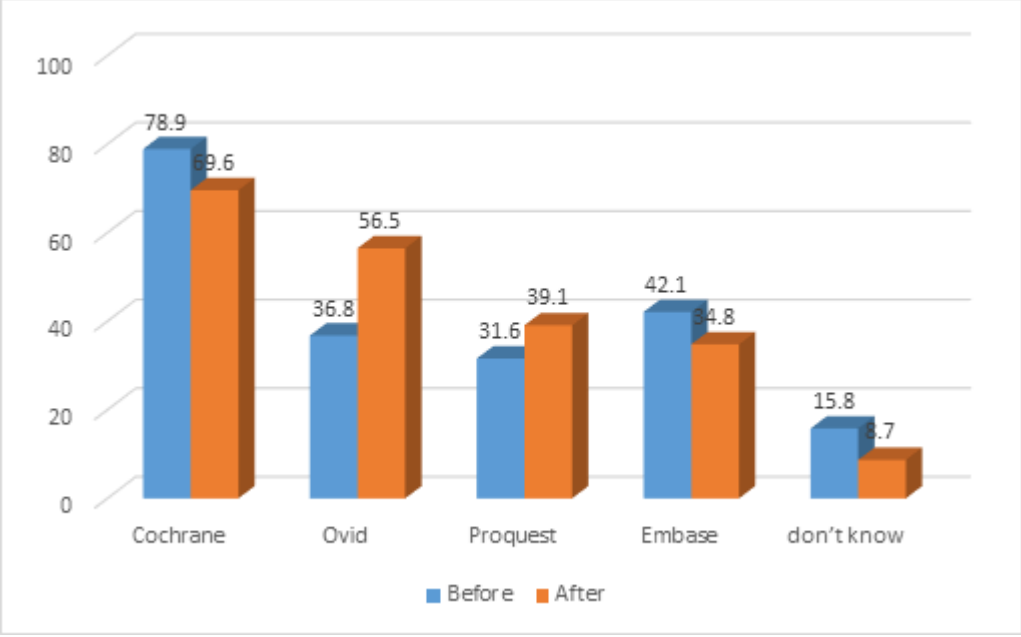


Figure 5: Pre and post questions on Medical databases

Students were then tested on their knowledge of predatory journals, how they can be harmful and were requested to select the incorrect answer. Choices given were i) your work could disappear ii) your work could be difficult to find iii) your profile could be exploited iv) you could lose the opportunity to publish your research in a credible journal

5) your impact factor in ISI could increase. The correct answer is 5 which shows that there is a 12.4% improvement after the session as shown in Figure 6.

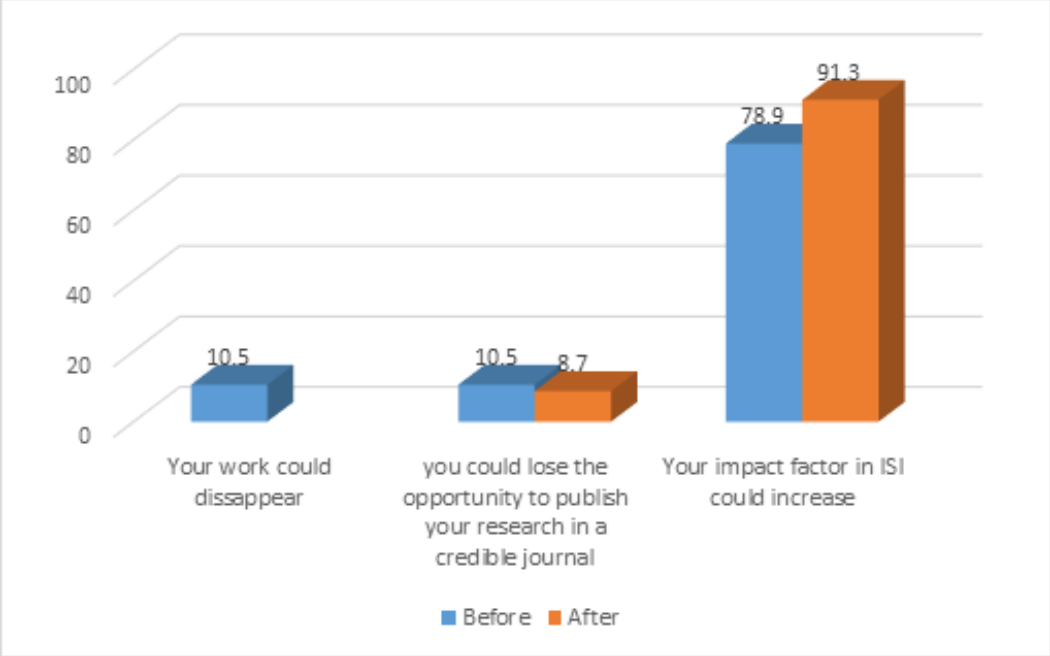


Figure 6: Pre and post questions regarding predatory journals

Subsequent questions asked whether the session was effective and useful to get the relevant information and then they were asked to rank the facilitator's overall presentation.

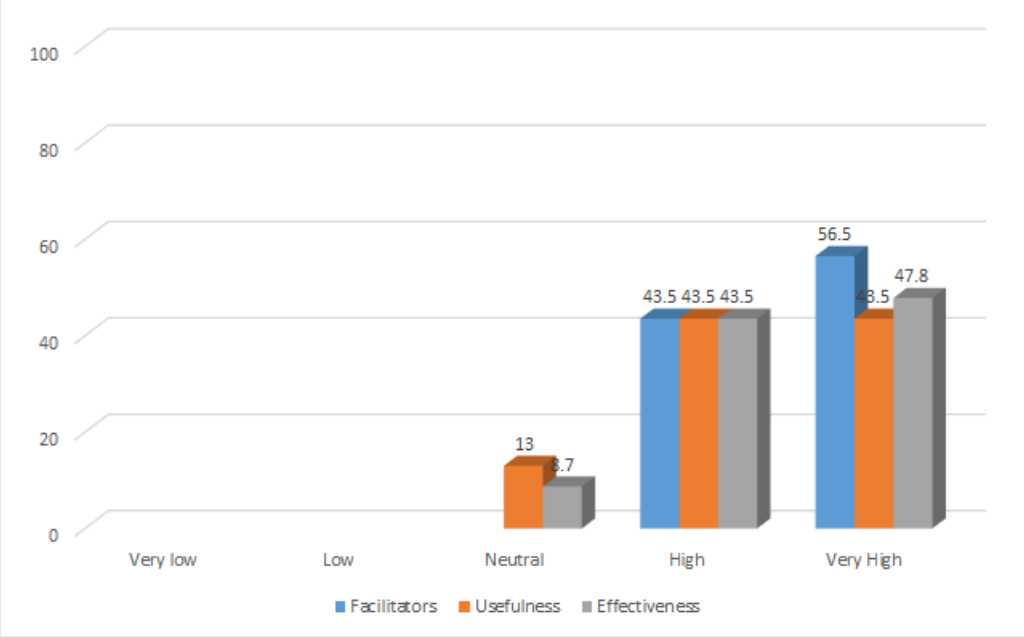


Figure 7: Effectiveness of the literacy session

For the final question, the students had to select the preferred mode of delivery. 69.6% preferred online while 30.4% still favoured physical interaction. A study by Bordoloi, Das, and Das (2021) observed that half of the respondents preferred blended learning, then only 22% preferred online learning and the rest preferred offline learning.

The outcome of using Reusable Learning Object (RLO)

Our preliminary findings showed that there was a significant increase in the knowledge score (six questions on literature search concepts) from pre- (mean=5.00, SD=1.2, n=108) to post- (mean=5.76, SD=0.60, n=59) RLO usage as Mann-Whitney Test revealed $p<0.001$. The confidence score (Likert scale 1 to 5 on user's confidence to search for literature to answer clinical questions) also significantly increased from pre- (mean=2.68, SD=0.97, n=37) to post- (mean=3.47, SD=0.99, n=15) RLO usage with Mann-Whitney Test showing $p=0.018$.

Based on the feedback survey, all responding users (n=38) would recommend this RLO to others, with the 'RLO being helpful' mean score of 4.79 (Likert scale 1 to 5). The main qualitative comments on 'what did the users like most about this RLO' reported is that this RLO is simple and easy to learn. The RLO has the following features such as mobile-friendly and available in digital format, reusable which means that it can be used time after time, support the learning objectives which is to explain the importance of search strategies in looking for relevant information using the health databases, offer bite-sized information that online learners can absorb quickly and effectively (Koh 2017).

The GA showed an intermittent increase of users over the months, which coincide with teaching sessions. Most accessed the RLO using a direct link provided by the lecturers. The RLO has accessed 655 sessions but only 91 (13.9%) sessions had completed all pages.

The outcome of using Libguides

There are three Libguides content that was designed for the students; the Medical Education Remote Teaching Resources, Clinical Ethics Resources for Healthcare Professionals, Bioethics, and Academics. These are information-sharing systems designed specifically to allow easy navigation for providing relevant resources in specific subject areas created by the Medical Librarians.

i) Medical Education Remote Teaching Resources Libguides

The guide includes open-access resources and several online resources from the library collection to support remote teaching and learning in medical education. It is considered to be a "living" resource that will change continually and to which each faculty member may contribute ideas, experiences, questions, resources to the librarians to update the content.

Figure 8: Medical Education Remote Teaching Resources Libguides

Table 1 shows that there are high views since the pandemic started in March 2020. The medical librarians with the faculty members have been using this platform in their teaching. The medical librarians have introduced this page in the literacy sessions to the medical students, lecturers, and researchers and received good feedback verbally. These resources will be updated from time to time. It is designed so that the faculty members can refer to this page as a one-stop center for them to access all free teaching resources.

Table 1: Number of views for the past 16 months

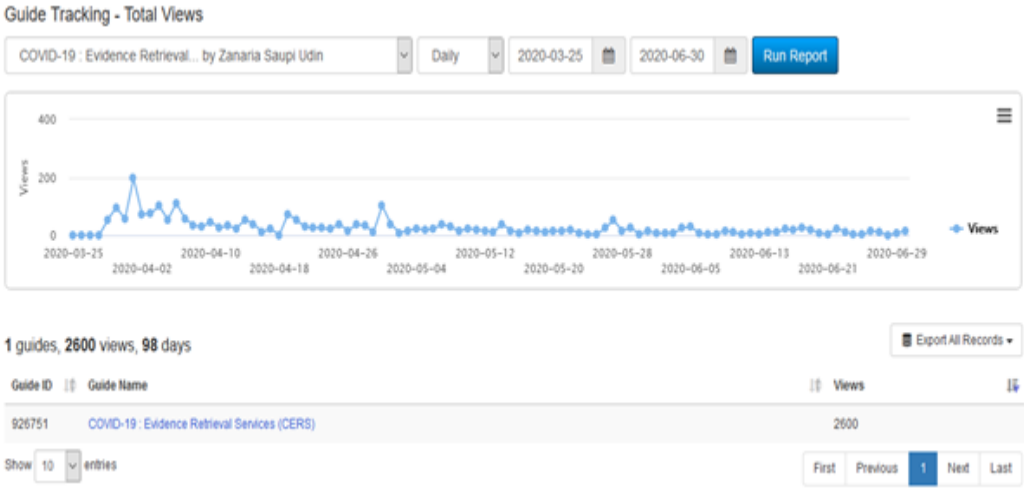
Year	2020												2021				
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mac	Apr	Total
Number of views	91	75	291	173	99	449	388	113	130	282	277	251	163	183	344	286	3595

ii) Clinical Ethics Resources for Healthcare Professionals, Bioethics and Academics

This guide provides a collection of COVID-19 clinical ethics resources. Among the resources available on COVID-19 are articles, news, clinical guidelines, and databases (all of which are free to use). COVID-19 clinical ethics are divided into several themes, including fair resource allocation, protecting our healthcare workers, protecting the vulnerable in our society, hospital obligations, and others. There were 1662 views within 439 days and it shows that this page is being referred to. The medical librarians will also introduce this page as an example of resources that they can refer to.

iii) COVID-19 Evidence Retrieval Service (CERS)

COVID-19 Evidence Retrieval Service (CERS) is a platform designed to help clinicians retrieve the best available evidence on COVID-19. A team of evidence-based medicine experts, librarians, doctors, and medical students provides this service. There were 2600 views within 98 days when the pandemic started. The medical librarians used this guide as an example to show the students the process of evidence-based practice (EBP). This service is no longer available, however, there are many examples that the librarians can use to explain to them from the beginning of the process of EBP till the end of the process which was displayed on this page.



CONCLUSION

The COVID-19 pandemic crisis has the potential to set a new standard for academic libraries, requiring them to make timely and critical decisions in support of online learning for students. These challenges may provide more opportunities for health sciences librarians to promote their value and become integral to the goals of their institutions. Transition to online learning and remote work has prompted increased access to and use of library online resources by students, faculty, and researchers seeking to maintain a sense of normalcy in their daily routine at the four academic health sciences libraries. The transition to online learning and remote work at the Medical Library has acted as a catalyst for increased access to and use of library online resources by students, faculty, and researchers who are attempting to maintain normalcy in their daily routine. To meet emerging needs in a rapidly changing environment, librarians must remain proactive, flexible, and agile in providing library services and managing library processes,

procedures, and policies. To stay healthy, productive, and creative, it is necessary to be able to quickly adapt to new technologies and the new normal, as well as to practice good self-care and attend to one's own emotional, social, and physical health needs.

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The Most Cited Articles of Information Literacy in K-12 Education of Asia Countries from 2010 to 2019

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ABSTRACT
In the twenty-first century, information literacy in K-12 education is crucial; it should encourage problem-solving techniques and critical thinking abilities for learners' fundamental knowledge at all levels of education, including through scholarly publications. The purpose of this study was to examine the most cited articles in information literacy research in Asia's K-12 education from 2010 to 2019 as well as to gain a better understanding on the important themes that emerged from the study. VOSviewer was used to display data in this investigation. This study will also discuss the future possibilities of information literacy research, as specified in research publications. This study found a paper titled "Using collaborative teaching and inquiry project-based learning to help primary school students develop information literacy and information skills", published in the Library and Information Science Research, as the most cited articles (78 times). Many Asian nations that scored in the top 10 with the highest average score on the PISA 2018 such as China (Beijing, Shanghai, Jiangsu, Zhejiang) (1st), Singapore (2nd), Macao, China (3rd) do not place a strong priority on information literacy research in K-12 education. Further in-depth investigations on the reasons for the lack of priority from these nations was also suggested in the study.

Keywords: Information literacy; VOSviewer; K-12; Asia countries; Most cited articles.

INTRODUCTION

In the twenty-first century, there has been a large spread of information which contains both useful and unfavorable information. In countries where information technology is not used thoroughly, this creates a digital divide. In addition, the rapid development of information technology also collects information either related or connected, gathering them altogether for people in great abundance in the digital world. It is difficult to verify such large amounts of information as being accurate. Integrity and reliability of the information. These conditions are known as "Information overload," which refers to the condition in which a person has difficulty understanding issues and making decisions because there is too much information (Yang, C. C., H. Chen, and K. Hong. 2003). Therefore, the ability to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information (Association of College and

Research Libraries 2000) to be beneficial is important for people of all generations, especially students.

Information literacy is one of the most important learning outcomes for students and is a core competency of a person of learning, gaining national and international importance, especially since students' Information literacy is one of the 21st-century skills, comprising of information literacy, media, and technology skills (Battelle for Kids 2019). To prevent the occurrence of problems for people of all generations, such as misinformation, disinformation and partial information, information literacy should be cultivated from the primary level. There are a variety of courses to promote lifelong learning and support skills that learners lack. Teaching and learning are student-centered with the integration of various sciences. This leads to a wide and ongoing study and research on students' information literacy on various issues both in the national and international context.

The number of references is considered as one of the indicators to measure the quality of academic output, especially research articles. The number of reference databases referenced has risen recently. Web of Science, Scopus, and Google Scholar are among the most frequently reference databases. These databases differ from the conventional databases that users are accustomed to, and because each database has its own set of features and search algorithms. An articles which called "the highly-cited", "top cited paper" and "most cited paper" will reflect the influence of the research article. and help to find important researchers in each field. It would be fascinating to examine the most cited articles and to gain a better understanding of the essential themes of information literacy in Asia's K-12 education from 2010 to 2019.

LITERATURE REVIEW

Information literacy and learning in the digital age

Currently, it is an era in which technology has been developed continuously, especially Information and Communication Technology (ICT), and it is a significant technological change. In the education context, learners prefer to use information technology to access information more. Educational institutions, therefore, have to adjust their thinking methods for developing the media that support teaching and learning in information literacy, making them be up to date and in various forms. In other words, they must be upgraded and enhanced so that existing learning process becomes a new source of knowledge that continues to focus on cultivating and promoting lifelong learning habits, which is the development of learning methods in the future. Information technology is used to emphasize the convenience of accessing information and to create and promote self-seeking knowledge.

Information literacy skills are applicable to all disciplines, learning environments, and educational levels. It enables students to master content and broaden their investigations, become more self-directed, and take greater control of their own learning (Association of College and Research Libraries 2000). Currently in the digital world where information is increasing and disseminating from a variety of sources, it is essential for people to possess information literacy skills. The people that succeed in life will be those who know how to seek the information that meets the needs and use the information to accomplish their own goals. Information literacy fosters innovate social development for

sustainability as well as expanding the learning scope of the person throughout life. In addition, the development of information literacy skills in a person is also an important part of the development of other skills, such as decision-making, critical thinking skills, and creative thinking skills. The development of information literacy skills in a person is essential to occur throughout a person's life. Starting with the cultivation of the habit of learning and learning from childhood to old age because having information literacy skills will provide people of different ages with tools to be used in the pursuit of knowledge continuously, so it is like lifelong learning. Education or human resource related departments need to focus on developing people into quality citizens.

The most cited articles

The term of "the highly-cited", “top cited paper”and "most cited paper" was used simply as a synonym of high citedness. Citing the sources used in research serves many purposes; for example, Calvin T. Ryan Library (2020) mentioned the importance of citing sources; it gives proper credit to the authors of the words or ideas in the researcher's paper. It allows readers who read that research to locate sources in order to learn more. Most importantly, citing sources consistently and accurately helps researchers avoid committing plagiarism in their writing. For citation, the citation qualification has several scholars, for instance, Kostoff, Barth, and Lau (2008) reported The metric used to gauge quality is the ratio of highly cited papers to total papers produced in sequential time frames. H-index is an index that is created to measure the productivity and impact of the work of a researcher, institution or country. Levitt and Thelwall (2009) mentioned highly cited articles are associated with high-quality research.

There are many articles containing highly cited articles from various fields. Several papers have analyzed highly cited papers belonging to category of library and information science. For instance, Blessinger and Hrycaj (2010) discussed and compared the majority of scholarly articles published in LIS during between 1968 and 2000 in different context. Ivanović and Ho. (2016) identified 501 highly cited articles published between 1956 and 2009 in 37 journals and analyzed the characteristics of highly cited articles published in the Information Science and Library Science category in the Social Science Citation Index. Elia and Sife (2018) analyzed top 10 cited papers in the field of library and information science which originated from 10 different institutions from six countries by google scholar, metrics was carried out to understand their main characteristics and features such as bibliographic details, authorship collaboration, author affiliation, citation counts and specialty. These most cited articles were published in 2006 and the list was released in June 2017.

While several academic research analyzed research articles in various library and information science categories that have been published in these areas, no analyses have been published of articles in the information literacy in K-12 Education of Asia countries, the subject of the current paper. The purpose of this study was to examine the most cited articles and to gain a better understanding of the essential themes of information literacy in Asia's K-12 education from 2010 to 2019. The research questions arranged in this study are listed below:

- What are the most cited articles in the information literacy research in K-12 education of Asia countries from 2010 to 2019?

- Among the most cited articles from 2010 to 2019, how about distribution of the most cited articles published in journals?
- What are the popular keywords used the most cited articles between 2010 to 2019?

METHOD

Article selection process

To examine the most cited articles and to gain a better understanding of the essential themes of information literacy in Asia's K-12 education from 2010 to 2019. The search string to be used for collecting the data related information literacy and K-12 selected information literacy research in K-12 of Asia countries from 2010 to 2019 which indexed the Scopus database. Results were refined by selecting the category; language=English, document type=articles, country/territory=Asia countries (41 documents). In this study, the criteria for selecting most cited articles were selected articles based on a h-index = 8 (of the 41 documents considered for the h-index, 8 have been cited at least 8 times). A final 12 articles which contained the top eight cited documents were obtained and used for this study to analysis and discuss. The retrieved data were imported, modified, and coded in each context into Microsoft Excel. Finally, data were inputted from .csv file and analyzed with Scopus database, which were then presented by the VOSviewer program for data visualization. The article selection process for this study as shown in Figure 1.

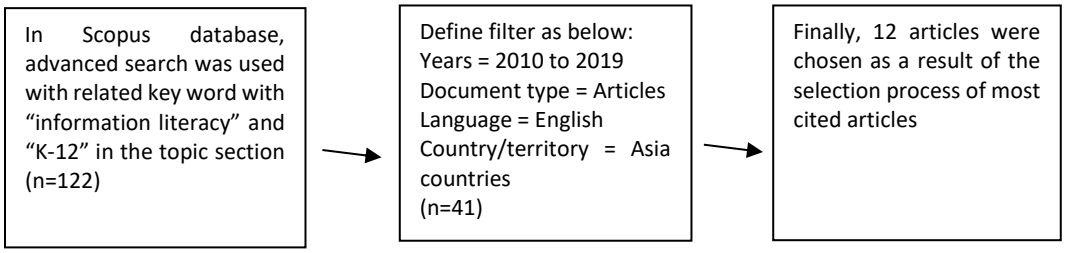

Figure 1: Article selection process for this study

Coding schemes

Several previous review articles, including Hwang and Tsai (2011), Wu et al. (2012), Hwang and Wu (2014), and Tu et al., (2018) were used to classify the articles. Furthermore, the coding schemes were evaluated and modified by two experienced library science experts, as detailed below.

- Sample group: the research sample groups were divided into nine groups: elementary school students, junior high school students and senior high school students, teachers, mix-group, non-specified, no participants, others, and institution/organization.
- Research methods: The research methods categories proposed by McMillan and Schumacher (2006) were used in this study. The coding scheme is quantitative, qualitative, mixed, and analytical methods.
- Research domains: Science (including physics, chemistry and biology), mathematics, arts, language, social studies (including history), engineering (including computers,

computer science), health, medical and physical education (motor skills), business or management, information science, mixed course, none, and general subject were the research domains identified in the literature. None subject means that the article only included (e.g. model (trend) proposed), system design, survey or review paper).

Data analysis

The data analysis procedure was conducted by two experienced library science experts which collaborate to studied and discussed the data together during the content analysis process. This study uses the VOSviewer program to create a data visualization and present data visualization of the most used popular keywords. And divided clusters from keywords used in the most cited articles in information literacy research in K-12 education of Asia coutries from 2010 – 2019.

RESULTS

The most cited articles in information literacy research in K-12 education from 2010 – 2019

Between 2010 – 2019, there are 41 articles in information literacy research in K-12 education of Asia countries (Hunsapun and Chen, 2020). Focus on the most cited articles found 12 articles were the most cited documents as shown in Table 1. However, no papers with cited papers in 2012 and 2019.

From all the publications under this study, the 12 most cited articles were identified. It was found that 251 papers had been cited at least once. H-index of this study is 8 (of the 41 documents considered for the h-index, 8 have been cited at least 8 times). The h-index is computed in Scopus, and finding articles is a popular topic; in fact, a previous article about the h-index is still one of the most popular articles. Three papers have been cited more than 30 times each. Of these 12 most cited articles, 4 were published by the researchers in Taiwan and included in the Scopus database, followed by Hong Kong (2 articles). China, Indonesia, Iran, Israel, Malaysia, and Singapore published 1 article. A paper titled “Using collaborative teaching and inquiry project-based learning to help primary school students develop information literacy and information skills”, published in the Library and Information Science Research, is the most cited articles (78 times). The top three of most cited articles of information literacy research in K-12 education during 2010-2019 are: Chu S.K.W., Tse S.K., Chow K. (cited =78), Li S.C., Pow J.W.C., Wong E.M.L., Fung A.C.W (cited = 36), Chang F.-C., Chiu C.-H., Chen P.-H., Miao N.-F., Lee C.-M., Chiang J.-T., and Pan Y.-C. (cited = 30).

Table 1: Characteristics of the most cited articles in information literacy research in K-12 education of Asia countries from 2010 to 2019

Rank	Authors	Title	Publication Year	Country/ territory	Totals of citation
1	Chu S.K.W., Tse S.K., and Chow K.	Using collaborative teaching and inquiry project-based learning to help primary school students develop	2011	Hong Kong, China	78

		information literacy and information skills			
2	Li S.C., Pow J.W.C., Wong E.M.L., and Fung A.C.W.	Empowering student learning through Tablet PCs: A case study	2010	China	36
3	Chang F.-C., Chiu C.-H., Chen P.-H., Miao N.-F., Lee C.-M., Chiang J.-T., and Pan Y.-C.	Relationship between Parental and Adolescent eHealth Literacy and Online Health Information Seeking in Taiwan	2015	Taiwan	30
4	Chang F.-C., Miao N.-F., Lee C.-M., Chen P.-H., Chiu C.-H., Lee S.-C.	The association of media exposure and media literacy with adolescent alcohol and tobacco use	2016	Taiwan	29
5	Wijaya A.	Students' information literacy: A perspective from mathematical literacy	2016	Indonesia	21
6	Foo S., Majid S., and Chang Y.K.	Assessing information literacy skills among young information age students in Singapore	2017	Singapore	12
7	Dorner D.G., and Gorman G.E.	Contextual factors affecting learning in Laos and the implications for information literacy education	2011	Malaysia	11
8	Liu E.Z.-F., Ho H.C., and Song Y.J.	Effects of an online rational emotive curriculum on primary school students' tendencies for online and real-world aggression	2011	Taiwan / Hong Kong	11
9	Sakai Y.	The role of readability in effective health communication: An experiment using a Japanese health information text on chronic suppurative otitis media	2013	Japan	8
10	Chen L.C., Chen Y.-H., and Ma W.-I.	Effects of integrated information literacy on science learning and problem-solving among seventh-grade students	2014	Taiwan	8
11	Ash-Argyle R., and Shoham S.	Professional self-efficacy and role perception of school librarians and their impact on the development of students' information literacy: An evidence-based study	2014	Israel	8
12	Baji F., Bigdeli Z., Parsa A., and Haeusler C.	Developing information literacy skills of the 6th grade students using the Big6 model	2018	Iran	8

Source: Scopus database updated on 26 April 2021

Different researcher/authors who are publishing papers in a given subject are displayed in this co-authorship map. The size of the circles correlates to each author's number of publications in the publication list. The results show 5 authors linkages between the circles indicate co-authorships in articles as show in figure 2.

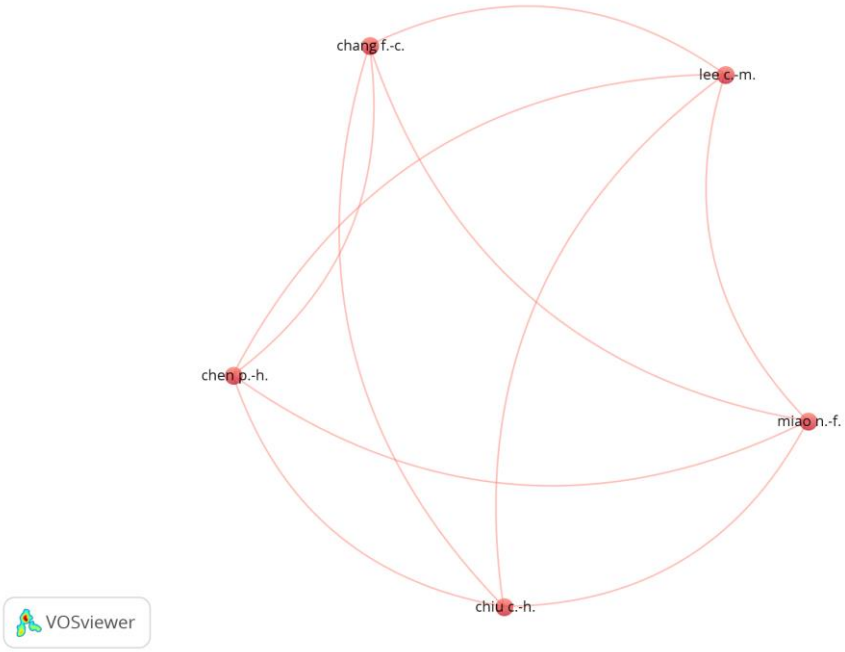

Figure 2: Co-authorship map with most cited articles in information literacy research in K-12 education from 2010 -2019 of Asia countries

Distribution of research journals

From 2010 – 2019, Malaysian Journal of Library and Information Science is the top journals published in information literacy research in K-12 education (2 articles). Another ten journals are published 1 articles as shown in Table 2.

Table 2: Overview of journal from 2010 to 2019

Journal	Number of articles
Malaysian Journal of Library and Information Science	2
Aslib Journal of Information Management	1
Journal on Mathematics Education	1
Journal of Health Psychology	1
Cyberpsychology, Behavior, and Social Networking	1
Journal of Information Literacy	1
Health Information and Libraries Journal	1
Turkish Online Journal of Educational Technology	1
Information Research	1
Library and Information Science Research	1
Education and Information Technologies	1

Distribution of sample group

As shown in figure 3, from 2010 – 2019, top sample group discussed in information literacy research in K-12 education studies are elementary school (4 articles), senior high school groups, mixed group, and others (2 articles), and junior high school (1 articles). When dividing the five years' period, journals articles from 2010 – 2014, top sample group discussed in information literacy research in K-12 education studies are elementary school, and others (2 articles). In journals articles from 2015 – 2019, top sample group discussed in information literacy research in K-12 education studies are elementary school (2 articles). It can be seen that elementary schools receive the most academic attention and discussion through academic articles. In the other groups, however, they are not getting the attention they deserve.

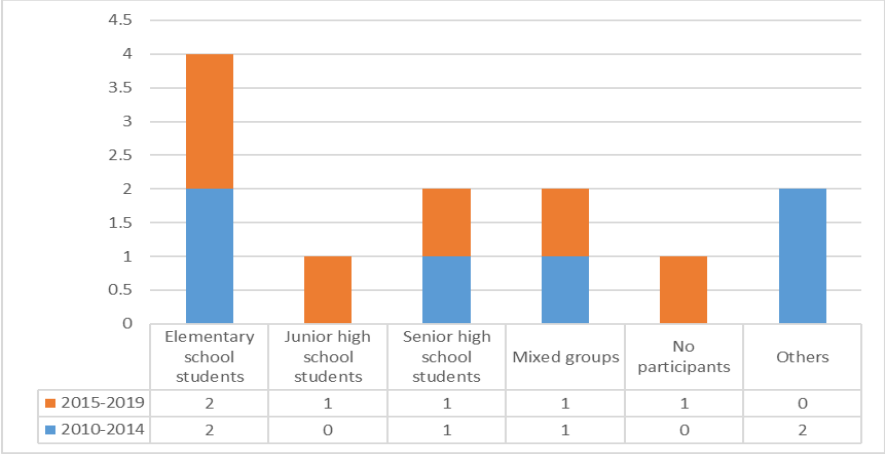

Figure 3: sample group of information literacy research in K-12 education from 2010 - 2019 of Asia countries

Distribution of research methods

Quantitative method is the most common research method that is used to study 8 articles, followed by Quantitative method, and Mix method (2 articles). Dividing the five years' period, in 2010 – 2014 quantitative method is the most common research methods used to study the 4 articles as well as the 4 articles in 2015 – 2019 as shoen in figure 4.

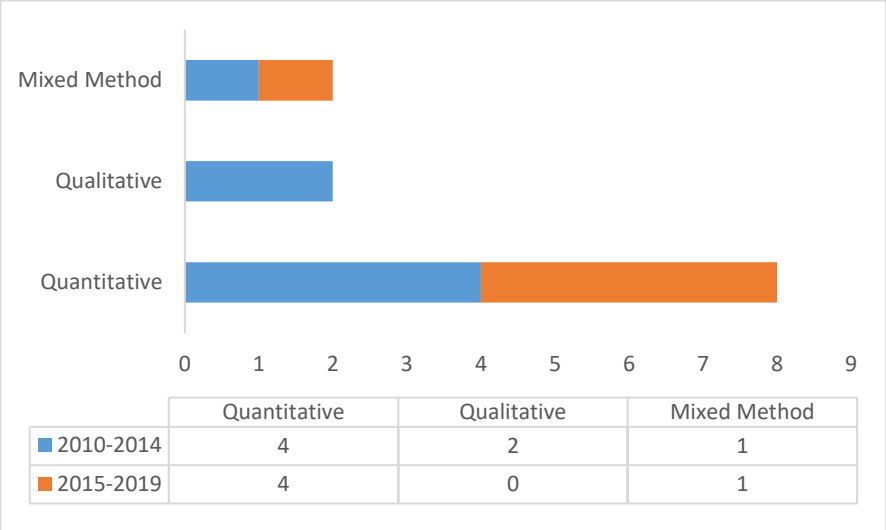

Figure 4: research methods in information literacy research in K-12 education

Distribution of research domains

General objects are the most research domains discussed (5 articles). A lot of research domains not discussed by researcher, for instance Arts, Language, Social studies (including history), Business or Management, Across-disciplines (e.g STEM), Mixed courses, and None (e.g. model (trend) proposed), system design, survey or review paper) as shown in figure 5.

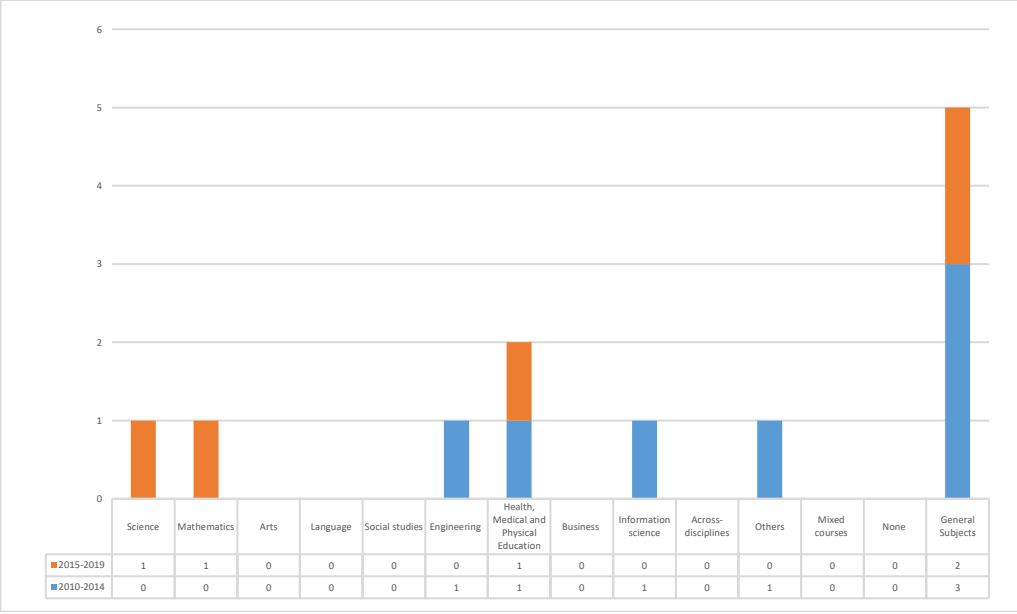

Figure 5: research domain in information literacy research in K-12 education from 2010 - 2019 of Asia countries

Distribution of most popular keywords and clusters

To determine most popular keywords in information literacy research in K-12 education from 2010 -2019 of Asia countries, the current study utilized VOSviewer to analysis keywords and group similar keywords between articles. A total of 45 keywords were provided by authors in the 12 articles that were collected in this study. The top keywords are information literacy (frequency=5). Another keywords frequency is one, for instance big 6, continuing professional development, elementary schools, professional self-efficacy, high schools, and school librarians etc. Based on VOSviewer analysis, the 45 keywords were divided into three groups, which are presented by difference colors. The largest set of connected items consist 25 items as shown in figure 6.

In group 1 red color, the main relationship was the integration of the different of K-12 education into information literacy education. The keywords in this group include big 6 (frequency = 1), continuing professional development (frequency = 1), elementary schools (frequency = 1), high schools (frequency = 1), primary schools (frequency = 1), professional self-efficacy (frequency = 1), reference work (frequency = 1), research processes (frequency = 1), role perception (frequency = 1), school librarians (frequency = 1), secondary schools (frequency = 1), and students (frequency = 1). For example, Ash-Argyle, R., and Shoham, S. (2014) evaluated the degree to which school librarians are involved in two different dimensions of their work that directly relate to developing information literacy and examined factors that may affect the degree of involvement in these two dimensions. This analysis reveals that school librarians primarily provide basic reference work services, which necessitate a low level of professional and technological skills and little collaboration with school teachers. Similarly, school librarians are mainly involved with two specific stages of the students' research processes, namely, the seeking and evaluation of information, which again reflect a low degree of IL training.

In group 2 green color, the main relationship was the integration of information technology and international standard assessment in to information literacy research in K-12 education. The keywords in this group include information literacy (frequency = 5), ICT in education (frequency = 1), mathematical literacy (frequency = 1), program for international standard assessment (frequency = 1), and tablet pc (frequency = 1). For example, Li, S. C., Pow, J. W. C., Wong, E. M. L., and Fung, A. C. W. (2010) integrate ICT in education to empowering student using Tablet PCs to support teaching and learning in a primary school in Hong Kong, and provide insights into how schools can harness and capitalize on the opportunities offered by emerging technologies. Wijaya, A. (2016) explored students' information literacy from the perspective of mathematical literacy. According to the findings of this study, students did not acquire three aspects of information literacy: recognizing information needs, locating and evaluating the quality of information, and making effective and ethical use of information. This result indicates that students have a low level of information literacy.

In group 3 blue color, the main relationship was the integration of the use learning assessment into information literacy research in K-12 education. The keywords in this group include assessment (frequency = 1), grade 5 (frequency = 1), i-competent model (frequency = 1), and primary students (frequency = 1). For example, Foo, S., Majid, S., and Chang, Y. K. (2017) assessed knowledge of Singapore Grade 5 (11 years old) students' understanding and proficiency in basic information literacy (IL) skills of defining

information tasks, selecting information sources, seeking information from sources and synthesizing and using information. They discovered that students struggled with identifying key information from an information task narrative, comprehending the use of reference sources and the role of librarians, distinguishing between fact and opinion, and selecting the best search strategy.

In group 4 yellow color, the main relationship was the integration of learning strategies into subject area related to information literacy. The keywords in this group include big 6 model (frequency = 1), comprehension memory (frequency = 1), inquiry learning (frequency = 1), and problem-solving (frequency = 1). For example, Liu, E. Z. -., Ho, H. C., and Song, Y. J. (2011) investigated the effects of integrating information literacy into science instruction on students' science learning and problem solving, between inquiry-based science curriculum infused with information literacy using the Big6 model and traditional lecture oriented instruction. This study's findings confirm that incorporating information literacy into regular curriculum using the Big6 model is feasible in school settings. The instructional time spent on integrated instruction was beneficial to subject content learning. Baji, F., Bigdeli, Z., Parsa, A., and Haeusler, C. (2018) evaluates an information literacy intervention in Iranian 6th grade science classroom. They found integrating the Big 6 model into the primary science curriculum helps the students to improve their information literacy skills as well as gain a deeper understanding of the research process.

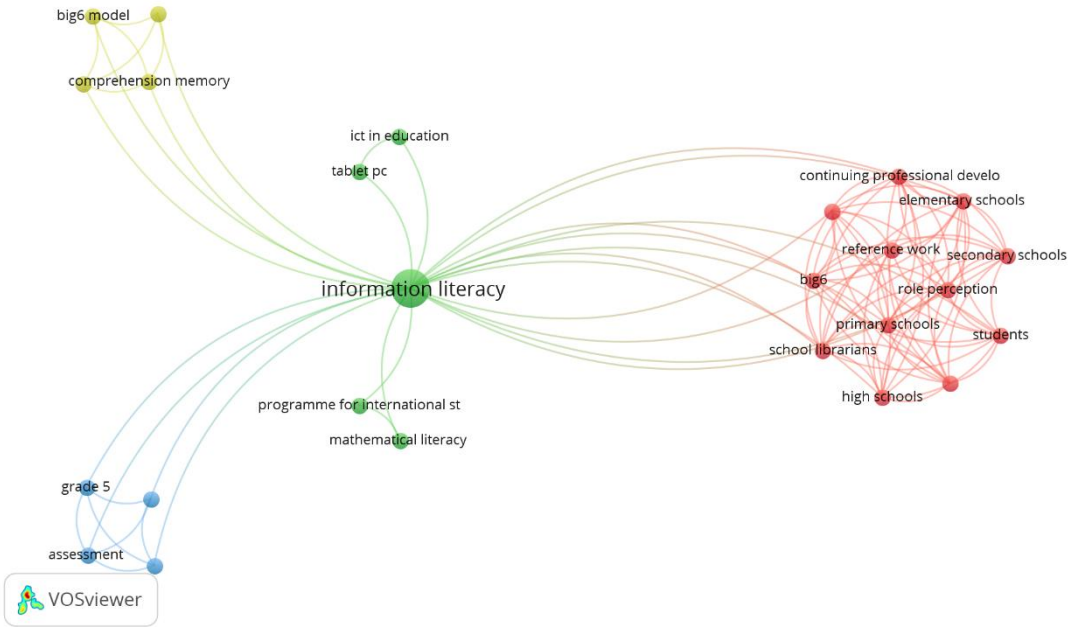

Figure 6: Co-occurrence map of keywords by authors

CONCLUSION

As the results, the top three countries that had the most published article journal in Scopus database in 2010 -2019, which are: Taiwan (4 articles) paper that focused on elementary schools and used quantitative method. Taiwan realized the importance of

information literacy in K-12 education. However, a study by Chen and Tu (2020) examined K-12 information literacy research in Taiwan. It showed K-12 information literacy research has decreased in the past ten years. A paper titled "Using collaborative teaching and inquiry project-based learning to help primary school students develop information literacy and information skills" published in the Library and Information Science Research in 2011, is also the most cited (78 times). This study has researcher cited this paper continuously. While some paper didn't have any citation more than four years, for instance, "Information literacy for the information literate: A model and case study from the Wuhan UNESCO training the trainers in information literacy program" by Pagell R.A. and Munoo R. (2010), "Civic action-oriented information literacy curriculum: An example of sixth-grade "US-Taiwan Eco-campus partnership program"" by Chen L.C., Shen K.-C., and Lai H.-C. (2016), "The analysis on the learning outcomes of elementary students in smart education" by Park I.-S., and Hwang J.-H. (2016).

According to Scopus database, it showed China, Singapore, Iran, Israel, and Malaysia published 1 article in 2010 – 2019. An interesting and surprising fact is that many Asia countries which ranked in the top 10 with the highest average score on the PISA 2018; China (Beijing, Shanghai, Jiangsu, Zhejiang) (1st), Singapore (2nd), Macao, China (3rd) not much focus on information literacy research in K-12 education. The researcher is of the view that further in-depth studies in these countries should be conducted in the area of information literacy research in K-12 education of the disregarded causes.

The top twelve authors who are the most cited authors, their research focus on was on junior high schools and used quantitative method. Many studies have shown that students from primary school to postgraduate level lack critical information literacy and IT skills, so there is a need for an effective pedagogical approach that will develop these skills, according to Chu S.K.W., Tse S.K., and Chow K. (2011). The purpose of this study was to see how combining a collaborative teaching approach with inquiry project-based learning (PjBL) affected the development of primary students' information literacy and IT skills. Two inquiry-based group projects were completed by students in a Hong Kong primary school. In guiding students through the two projects, a collaborative teaching approach involving three teachers from different subject areas (general studies, Chinese, and IT) and the school librarian was used. According to the findings, this program had a positive impact on the development of various dimensions of the students' information literacy and IT skills. Information literacy research in K-12 education should use qualitative methods because they are exploratory; they seek to uncover respondents' opinions, thoughts, and feelings. It is most commonly used to provide context for new concepts, theories, and results. At the moment, the qualitative method is widely used to obtain more in-depth and insightful information from a sample group.

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The New Normal of Staying Connected: Content Analysis of Facebook and Instagram Posts of an Academic Library in the Era of a Pandemic

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ABSTRACT
The purpose of this paper is to explore how the University of Malaya Library uses social media such as Facebook and Instagram to connect with library users and the public in the era of COVID-19 pandemic. The significance of this study at present stage is that the findings and conclusion made can be used for promotional activities, thus saving cost and manpower. By analyzing the library's Facebook and Instagram content, this paper demonstrates the tools used to identify the type of content users respond to and have enjoyed, in order to make the social media marketing more impactful. A qualitative methodology using the content analysis approach was applied. A total of 459 posts from both Facebook and Instagram were examined using key variables such as the number of user reactions to a particular post, the number of posts and the average engagement rates. The findings reveal that even though the total number of posts under 'marketing/promotion' were the highest for Facebook, 'Community Building' posts generated the most reaction. The demography also shows that most Instagram followers are below the age of 35 at 80.3% while Facebook has more followers from the age 35 and above at 32% compared to Instagram 19.7%. Based on the results, although Facebook has more followers, Instagram has a much higher engagement rate. This study also discusses practical implications that can be considered for better engagement, content design and marketing strategies towards the adoption of the new normal.

Keywords: social media; Pandemic; Engagement rate; Content analysis; Library promotion; Academic library.

INTRODUCTION

Social media is essential in the digital landscape nowadays and its influences are spreading wide across multiple demographics with the majority of people sharing its contents. According to Datareportal Global Overview Report which was published on 27th January 2021, social media growth has accelerated significantly since the outbreak of COVID-19

(Datareportal, 2021). Its user numbers have increased by more than 13 percent over the past year with nearly half a billion new users taking the global user total to almost 4.2 billion by the start of 2021. This is particularly the case for platforms such as Facebook, Whatapps, Instagram, Twitter, YouTube, Tik Tok and Blogs. Contrary to popular belief, social media is not limited to Millennials and Gen Z merely updating their social lives. More and more corporations are now investing heavily in getting their social media presence acknowledged in order to attract more consumers (Wu, Zha and Li, 2013).

As the number of users are expanding exponentially by threefold, an organization would likely miss out on potential audience by not being adopters of social media. The ubiquity and high uptake of social media makes it suitable for students, faculty members and administrators in higher learning institutions. Academicians and non-academicians alike can leverage social media marketing to enhance university programs and improve students' enrolments and usage of services. Academic libraries have not been left behind and have also been adopters of this global phenomenon (Kolhar, 2021). Over the years, academic libraries have responded to this change with many now believing social media has a vital role to play in moving academic libraries beyond their traditional borders and helping them engage new stakeholder groups. It is now widely accepted that social media is a tool that enables users to join together and share in the commonalities of research, learning and the university community.

Because an overwhelming majority of today's university students use social media, having a presence on social media is especially important for academic libraries (Garofalo, 2013). The University of Malaya Library (UML), the first Research Intensive University (RU) in the country, had introduced Web 2.0 applications as part of its services in October 2008. A survey of the effectiveness of Web 2.0 applications in promoting library services in University of Malaya Library shows that Facebook is the most popular tool used by UM students and the main reason to use Web 2.0 application is for information communication (Faizal, A. Aziz, Adila Mustafa & Zanaria Saupi, 2014). Its usage can be found in four main areas specifically related to promotional activities, information dissemination, medium for answering user enquiries, two-way communication and instant feedback.

LITERATURE REVIEW

A study by Taylor and Francis (2016) reported that more than 70% of libraries use social media tools for promotional purposes, collection management, outreach or for enhancing teaching and learning. However, not much research has been carried out to identify such practices, and how institutions and individuals go about their social media activities in a library setting or measures its success.

In his book, King (2015) indicated that Facebook, Twitter, Instagram, Pinterest, LinkedIn, Google + and Flickr as popular social media platforms among libraries. While Facebook overall growth has slowed, it still remains the most popular social media site with other sites seeing increases in usership. One particular platform, Instagram has its number of account holders steadily increasing. Pew Research Centre reported that Instagram is the second most used social media platform among people ages 18-29 in the United States, after Facebook. Many libraries also use Twitter to broadcast information to their

stakeholders. They update their Twitter accounts with a range of information, both original and retweeted from other Twitter users. Studies have shown that these tools have become the means for libraries to communicate with users (Ofili & Emwata, 2014).

And as the social media landscape is constantly evolving and user online interaction patterns change, libraries' social media strategies should be evaluated and readjusted on a regular basis (Brookbank, 2015), to ensure not only the retention but also the expansion of their user base.

Various studies have examined the use of social media in higher education. Much of the reviewed literature have been focused on identifying the different tools that are being used by the different academic libraries and studying perception and influences to adopt social media. Ali and Parveen (2015) examined the use of Web 2.0 tools by Engineering libraries which included the different social media networks. Chu and Du (2013) explored the use of social networking tools in academic libraries, specifically examining extent, perceptions and factors influencing adoption.

In a study by Ihejirika (2021), it was stressed that the clarity of purpose and adequate planning been adopted by libraries for social media marketing because these have been established as essential ingredients for creating and sustaining social media engagement.

Use of social media by academic libraries during COVID-19 Pandemic

Social media platforms provide an opportunity for wider communication and collaboration between academic librarians and online users. During the COVID-19 spring lockdown, Polish university libraries used social media to engage with patrons while the physical location was closed. Digital content such as texts, graphical information, video sequences and links were posted to draw users' attention to services provided by the library (Gmiterek, 2021). Social media have also emerged as an effective tool for risk and crisis communication during disasters and emergencies (Eriksson, 2018), and individuals turn to social media to look for updated information on critical situations, as well as for getting emotional support (Valentini et al., 2017).

The global crisis brought about by the coronavirus COVID-19 had resulted to libraries changing their services to be provided to partly or solely online including remote access for electronic resources, virtual references and research support as well as communication and engagement with the community via library web sites and social media (Guo, Y. J.et al, 2021; Rafiq, M. et al, 2021; Winata, A. P., Fadelina, R., & Basuki, S., 2021). Even if the library physical space is closed to its users, the library staff must continue to provide its service given the fact that they represent the main source of trust in the distribution of verified information (Tîrziman, 2020). Social media was found to offer an interactive, collaborative, conversational and community-based platform for crises communication (Al-Saggaf and Simmons, 2015, Spence et al., 2015; Spence, Lachlan and Rainear, 2016; Yates and Partridge, 2015).

In Greece during the lockdown, librarians rapidly responded to the pandemic by organizing and disseminating timely and accurate information about COVID-19. For example, the library social media use 21 National Documentation Center (2020) to launch a daily updated COVID-19 scientific information website, which accumulated coronavirus-related scientific papers (including abstracts in the Greek language), covering various

research areas, such as medicine, business, psychology, education and tourism. The Library and Information Center of the University of Patras (2020) Greece also developed a webpage dedicated to this topic, whereas the Library of the Hellenic Parliament provided links to select free online resources about COVID-19, ranging from librarianship to health science and economy. Similarly, at the University of Malaya Library, two platforms were created upon collaboration with the Faculty of Medicine; Clinical Evidence Retrieval Service (CERS) and Clinical Health Ethics Resources. These tools aim to assist clinicians by retrieving the best available evidence regarding COVID-19 and guide healthcare professionals during their decision making involving pandemic patients.

The need for a content analysis

Organizations are increasingly looking for ways to develop long-term, extra-transactional relationships with stakeholders on social media (Hoffman & Fodor, 2010). Facebook "likes" to have been shown to deliver pragmatic benefits for an organization (Beukeboom, Kerkhof, & de Vries, 2015), and so interest has been growing to fully understand what prompts likes, comments, and shares (Johnson, Safadi, & Faraj, 2015). An analysis of Facebook contents of Vietnamese academic libraries showed that it was mainly used to encourage reading and to transmit announcements. Users' engagements were low, and Duong (2021) suggested that postings with a higher level of vividness may be a better practice with Facebook as users interacted more when the posts had photos or videos.

The current Facebook newsfeed selection algorithm shows that organizational content that has not received many likes, comments, or shares could drop out of a user's view altogether, making it more important to have content that motivates a response from users. According to Facebook Akos Lada (2021), the ranking algorithm are based on 1) Relationship: Is the post from a person, business, news source or public figure that the user often engages with? 2) Content type: What type of media is in the post, and which type of media does the user interact with most? (i.e., video, photo, link, etc.) 3) Popularity: How are people who have already seen the post reacting to it? Are they sharing it, commenting on it or ignoring it? 4) Recency: How new is the post? Newer posts are placed higher.

In view of this, libraries should create content that would generate interest of users and try to engage them or feed them links to content they would be interested to find out more. This is necessary to ensure growth trends. King (2015) suggested that Facebook administrators should examine the reason behind a drop off in the number of followers to take remedial actions. The library would not be able to increase engagement levels or gain more monthly referrals if its users are unfollowing the social media channels.

In Malaysia, few studies have been conducted on content analysis of social media. The last comprehensive study was conducted by Ayu & Abrizah (2011) over a decade ago. Furthermore, as of July 2021, there seems to be limited information available on social media usage locally in times of crises particularly during a pandemic based on literature searches in Web of Science and Scopus database. The goal of this study is to fill a gap in the literature by analyzing academic library posts in social media and studying how users engage with these posts. This is important to sustain growth trends and thus assist libraries in formulating better strategies to manage social media effectively. It is however focused to the University of Malaya Library's (UML) Facebook and Instagram platforms only.

Research questions

The key objectives of this study were aimed at answering the following research questions:

1. What type of social media content did UML make available during the pandemic?
2. What type of post works best on each platform?
3. Is the number of likes or the existence of comments related to the post category?
4. What level of engagement did the followers have on the Facebook and Instagram account of UML during the pandemic?
5. What social media content was the most popular?

RESEARCH DESIGN

To answer the research questions, this study used a qualitative methodology using the content analysis approach. A comprehensive data analysis was implemented based on the data recorded in the library social media accounts. The data recorded are the total number of followers, media type of posts, the number of responses and reactions (like, love, haha, wow, sad and angry), comments and shares. Data collection was mainly derived from Facebook Insights. However, since Instagram Insights only cover past 30 days analysis, data had to be collected manually using the Excel spreadsheet.

Since COVID-19 is still ongoing in the country, the research gathered data from 1st January 2020, approximately when it appeared in the local news, to 6th June 2021. The duration of the study is longer compared to other content analyses researches (Chan 2020, Duong 2021) so that a detailed finding can be established throughout the span of time. During this period, the library had various level of opening and closure, from a total lockdown, partial opening for staff only to a minimized number of patrons.

Analysis of the content included sorting the posts into categories and sub-categories which were then assigned into codes. Initially textual based data, the codes were converted into numerical figures to allow for statistical analysis (Phillips, 2011; Duong, 2021).

The entire process is listed as below:

1) Downloading the data from Facebook Insight into Excel format. For Instagram, data collection was gathered by going through each posting manually;
2) Coding the posts by relevant categories and sub categories;
3) Analyzing the relationship among media type, purpose category and total reactions, comments and shares;
4) Taking note of the number of followers for each site on 6th June 2021.
5) Calculating the engagement rate of posts;

According to Siel (2019), engagement rate is the currency of the social media marketing industry. Higher engagement rate signifies the content is resonating with the audience and that engagement formulas put vanity metrics like followers, likes and impressions counts into a more reliable perspective. Even if the number of followers is high, if they

are not engaged with the content then the social media efforts are considered to be somewhat unsuccessful.

Engagement rate is a formula that measures the amount of interaction the social content earns relative to reach the audience in terms of reactions, comments and shares. There are various ways to measure the engagement however this study has adopted Bonson and Ratkai (2013) earlier metrics measurement which was also used later by Lam et al (2019).

Table 1 : Facebook metrics for engagement

Popularity	P1	Number of posts liked/total posts	% of posts liked
	P2	Total likes/total number of posts	Average number of likes per post
	P3	P2/number of fans x 1000	Average number of likes per post per 1000 fans
Commitment	C1	Number of posts commented/total posts	% of posts commented
	C2	Total comments/total number of posts	Average number of comments per post
	C3	C2/number of fans x 1000	Average number of comments per post per 1000 fans
Virality	V1	Number of posts shared/total posts	% of posts shared
	V2	Total shares/total number of posts	Average number of shares per post
	V3	V2/number of fans x 1000	Average number of shares per post per 1000 fans
Engagement	E	P3+C3+V3	Stakeholder engagement index

Engagement here is defined as stakeholder engagement index per post per 1000 fans, in the cases of P3, C3, and V3, multiplication by 1,000 was used in order to offer the possibility of a better comparison, as the original results were close to zero.

Another method of acquiring the engagement rate is by referring to Facebook Insights as follows:

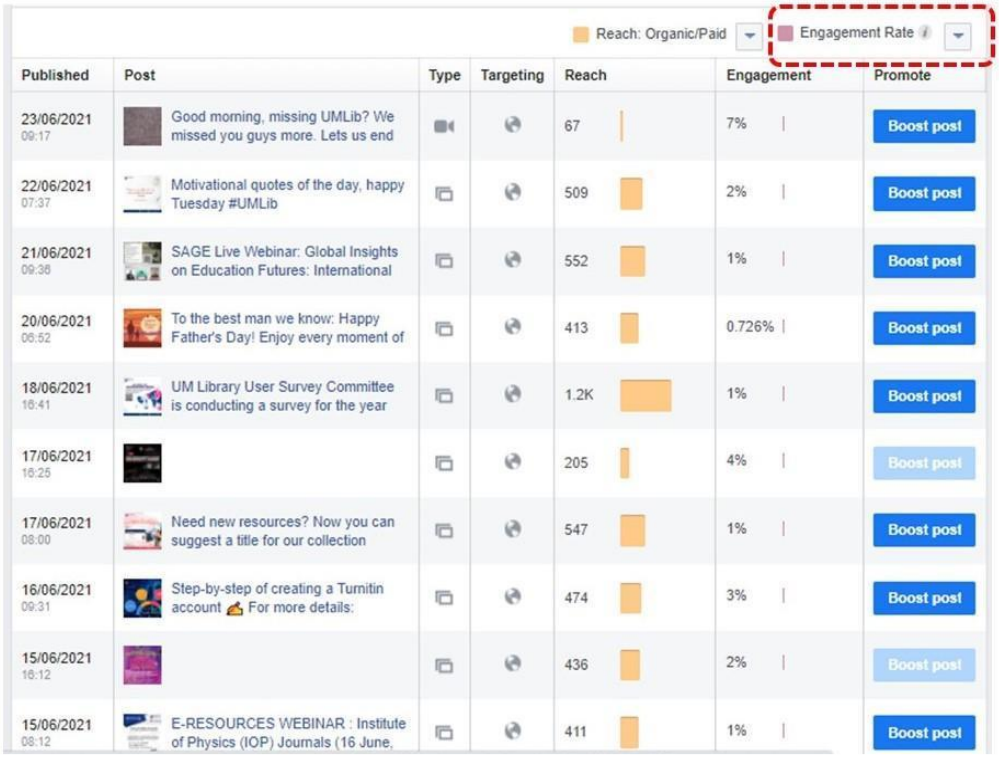

Figure 1: Engagement rate per post in Facebook Insight

The engagement rate (ER) on Facebook for a post is calculated as the number of engaged users divided by the total reach of that post. This is then multiplied by 100 to turn it into a percentage. Engagements on Facebook include reactions, shares, comments, and some clicks on links, videos, and images. To calculate the average, the ER posts are added, and then divide by number of posts:

- Average ER by post = Total ER by post / Total posts

In order to get the average engagement rate (ER), the total of ER during the period is calculated and divided by the number of posts.

This formula measures engagements by followers on a specific post and provide a more accurate measure of post-by-post engagement.

RESULTS

UML has initiated Facebook earlier than Instagram in 2008 and has garnered more than 28K followers over the years. Instagram on the other hand, was set up 7 years ago and has 1,945 followers as of 6th June 2021. A total number of 459 posts were collected during the specified period as shown in Table 2.

Table 2: General Information on UML Facebook Page and Instagram

Platform	Date created	Total no of followers (as of 6th June 2021)	Total likes (as of 6th June 2021)	No of Posts (from 1st Jan 2020 to 6th June 2021)
Facebook	May 2008	28,245	27,731	250
Instagram	January 2014	1,945	NA	209

Figure 2 shows that the majority (80.3%) of Instagram followers are below 35 age group while FB has more followers from above 35 at 32% compared to Instagram 19.7%.

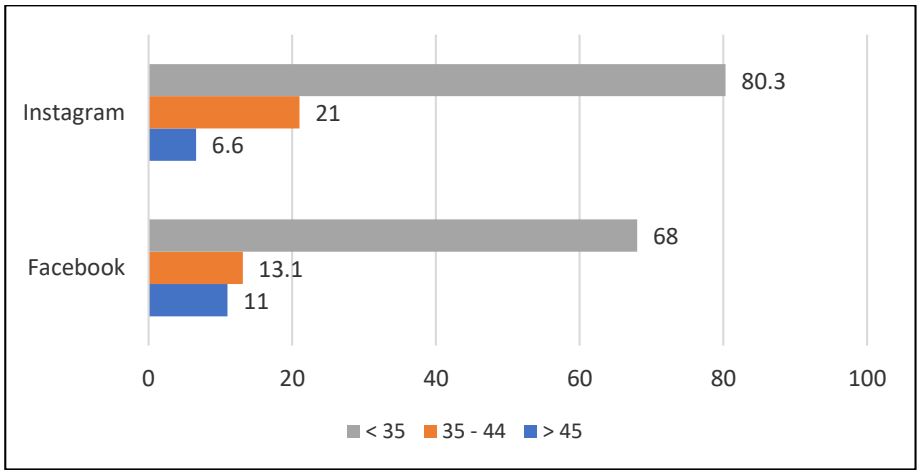

Figure 2: Comparison between FB and IG followers age group (%)

In accordance with the coding scheme by Chan et al (2020), Table 3 shows four main categories and 10 sub-categories with explanation and examples. Although there are occasions when the posts might overlap and served more than one category, steps have been taken to code these posts where the weightage are more. For example, a post of a quote with a nostalgic image of the library would be placed under C3/S6.

The breakdown of posts according to the categories are shown in Figure 3. The main topics of both Facebook and Instagram are on Marketing/Promotion (46.89%, 35.3%) followed by Community Building for Instagram (32.06%). The fight against COVID-19 has seen the library sharing genuine information on COVID-19 in Facebook, addressing mental health issues, postings with added humour under the category General Info (29.2%).

In the early phase of the pandemic, data derived from Facebook Insights shows that some of the general posts on COVID-19 have generated a lot of interest from the followers. As shown in Table 4, a video of an alumni student from China had the highest engagement rate at 18% with 59 Likes. Another post 'Who's missing the library as much as we do? Hopefully, it won't be long before we get to enjoy the physical side of the library again <3 #StaySafe #StayatHome' had a total reaction of 1008, 110 shares and 117 comments.

Table 3: Categories and subcategories of posts

Codes	Purpose	Explanation/example
C1	Library news dissemination	Announcement about library operations or unavailability either in the short term or long term.
S1	Library hours	Library Opening Hours during Lockdown, MCMO, normal hours. Eg. Following the total lockdown in Malaysia which will take effect on 1 June - 14 June 2021, UM Library will be CLOSED to all users until further notice.
S2	Systems/Aircond/ Internet down	Library systems or databases unavailable. Eg. Please be informed the library systems will be shut down temporarily from 27 May – 1 June 2020 for system maintenance.
C2	Marketing	Promotion of library events, facilities, collections, other services and publications.
S3	Library events	Databases training, webinars, conferences. Eg. UMLib e-Resources Webinar Online: China National Knowledge Infrastructure (CNKI) (1st Session – Chinese) Speakers: Marissa Gu 顾潇颖, Regional Manager CNKI 3 June 2021 10.00am – 11.00am
S4	Reading promotion	Read@Uni and any other activities to encourage reading. Eg. Jom baca bersama untuk 10 minit, jadikan budaya membaca sebagai sabahagian hidup kita. Baca itu terapi
S5	Collection, Services or facilities	Live chat, special collection, repositories, library orientation etc. Eg. Our librarians are online from 8.30 am to 5.00 pm (Monday - Friday) via Live Chat https://direct.lc.chat/9313620
C3	Information or knowledge sharing	Sharing of general information
S6	General info	postings that are educational and informative but are not related to the library operations or resources such as motivational posters, quotes, trending topics or something fun. Eg. Shoutout to our frontliners who are fighting COVID-19
C4	Community building	Congratulatory (achievements eg. completing exams & awards,), as well as congratulating the library or the university for being recognized or achieving a high ranking status nationally or internationally. Can also include memorable buildings or events which are considered nostalgic. Postings can be in the form of texts with images or videos.

S7	Greetings	Festivals, New Year etc. Eg. Happy Librarian's Day 2021 #ThrivingForTheNation
S8	Achievements	Ranking status, university or library achievements including students. Eg. Currently ranked 9th! We made it to the top 10 universities in Asia by QS Ranking. Congrats!
S9	Important people of the University	Videos of University's VIP eg VC/DVC or Chief Librarian. Eg. VC Activities (Photos)
S10	Nostalgia	Memorable events/buildings/ Photos of staff

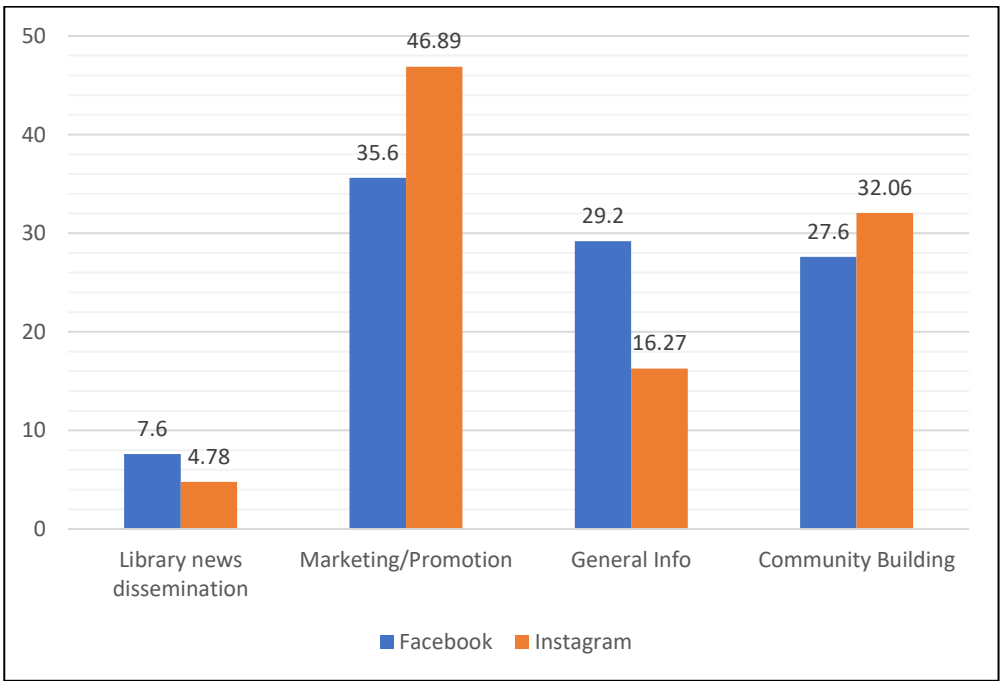

Figure 3: Total number of posts (%) by categories

Table 4: General Posts on COVID-19 and the rate of engagement (%) in Facebook

Date	**Post**	**Engagement Rate (%)**
26/1/2020	Understanding the facts about the Corona outbreak. Stay safe everyone. Image Credit: The Sun	5

27/1/2020	Good public hygiene practices that everyone should follow even without the epidemic. Source: CBC News	4
19/3/2020	Our ex student from Beijing giving tips on self care to stop the spread #Covid19 #UMalumni #StaySafe	18
21/3/2020	Above all, remain calm and focused.	11
25/3/2020	Here's a list of free access resources that has been compiled. Check it out, https://umlib.um.edu.my/freeaccess/	5

Table 5 displays a comprehensive breakdown of the posts by sub-categories. Promotion of collections/services/facilities is the next highest after General Info at 17.2% for Facebook and highest for Instagram at 22.49%.

Table 5: Percentage (%) of Posts by sub-categories

Category	Sub-category	No of FB Posts	% of FB Posts	No of IG Posts	% of IG Posts
C1 Library news dissemination					
	S1 Library Operation	15	6.0	9	4.31
	S2 Systems/Aircond/Internet down	4	1.6	1	0.48
C2 Marketing					
	S3 Library events	29	11.6	38	18.18
	S4 Reading	17	6.8	13	6.22
	S5 Collections/services/Facilities	43	17.2	47	22.49
C3 Information/knowledge sharing					
	S6 General Info	73	29.2	34	16.27
C4 Community Building					
	S7 Greetings	37	14.8	43	20.57
	S8 Achievement	15	6.0	0	0.00
	S9 University dignitaries	11	4.4	9	4.31
	S10 Nostalgia	6	2.4	15	7.18

Table 6 below shows the total number of posts, reactions and comments of each category. It can be seen that even though the total number of posts under 'marketing' were the highest at 89 for Facebook, 'Community Building' posts generated the most reaction with a total of 133,739. Achievements, greetings are more likely to generate reactions from the followers compared to promotion of events or library services/facilities/resources.

Table 6: Facebook & Instagram interaction by categories

	Library news dissemination	Marketing	Information/ Knowledge sharing	Community Building

	FB	IG	FB	IG	FB	IG	FB	IG
Total posts	19	10	89	98	73	34	69	67
Reactions	187	421	2,300	2,149	1,194	1,375	133,739	1,952
Comments	15	37	350	96	74	32	411	56

Facebook and Instagram are interactive media that enable users to respond to what has been posted. People can make reactions (Like, Love, Haha, Wow, Sad and Angry), share or comment on Facebook and while on Instagram, users are allowed to like and comment. Sharing comes in the form of repost but this feature was not taken into account in this study because not many users are familiar with it. The calculation of the engagement rate below is using the formula shown in Table 1 which reveals that even though Instagram has a smaller audience compared to Facebook, the engagement rate is much higher.

Table 7: Number of posts' engagements from 1st January 2020 – 6th June 2021

Social Media Site	**Facebook**	**Instagram**
No of followers (as of 6th June 2021)	28,245	1,945
No of reactions (for FB eg. like, love, haha, wow, sad and angry; for IG eg. like)	7,166	7,516
No of comments	846	221
No of shares	1823	NA
Engagement rate (%)	1.4	15

An analysis of media used in the posts shows 4 main types namely, links, photos, shared videos, status and in-house videos. Since Instagram is an image sharing app, the media type used has been categorized as photos, posters and videos. Combination of textual and graphical elements to promote events, greetings or instructional information are placed under 'posters'. Table 8 below shows that shared video and in house video have the highest engagement for Facebook and Instagram while videos and photos have better engagement rate compared to posters in Instagram. New apps in Instagram such as Reels and Story have higher engagement as these are informative as well as entertaining. Similarly, the use of Tik Tok in videos have boosted the engagement among the library's Instagram followers.

Table 8: No of posts and engagement by media type

	Media type	**Total no of posts**	**Total no of engagement**	**Average no of engagement per post**
Facebook	Link	54	223.857	4.15
	Photo	156	548.256	3.51
	Shared video	10	78	7.80
	Status	7	37	5.29
	Video	23	149	6.48
Total		250		

Instagram	Photos	32	2037	63
	Posters	146	3413	23
	Videos	31	2287	73
Total		209		

Table 9: Top 3 posts of Facebook and Instagram based on engagement rate

Site	Date	Post	Engagement Rate (%)
FB	16/1/2020	Caption : Now that the exam is over would be a good time to borrow a Kindle at the service counter or grab a book from the free range reading section Media : Sharing of an article link titled 'People who read books are nicer than those who don't, study finds'	32
	4/6/2020	Message from VC	23
	31/12/2020	New Year Celebration showing a photo changing the year at the iconic fountain	20
IG	1/1/2020	A shared video changing the year at the fountain and count down	25.8
	19/3/2020	A photo of the security guard & a medical doctor. Caption : thank you to all frontliners who work hard to protect our safety and health	22.2
	20/1/2021	A short Tik Tok Video on how to access UM Exam Papers	16

Table 9 above shows that simple and focused postings have more engagement. For Instagram 'how-to' video that are providing instruction on how to get the best out of the services and facilities in an entertaining way yet informative seems to be a more effective way of capturing audience attention. For Facebook, postings that are from the category Community Building also fare well with users.

Messages which are instructional in essence while advocating a cause seem to be favored by users as can be seen in Figure 4 which happens to be the top post for Facebook meanwhile Figure 5 is the top post for Instagram. Figure 5 shows a video clip of a New Year celebration at the university.

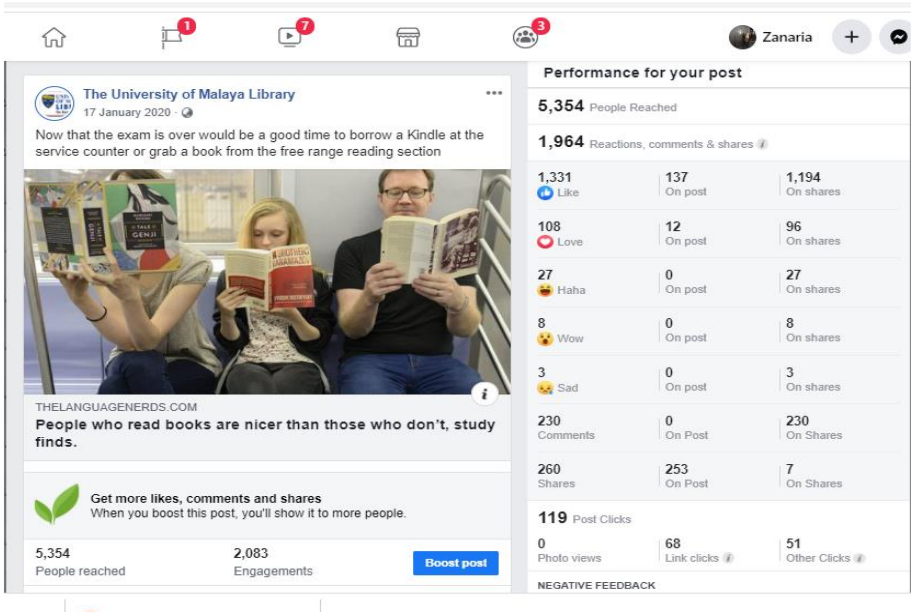

Figure 4: Screenshot of Top Post for Facebook

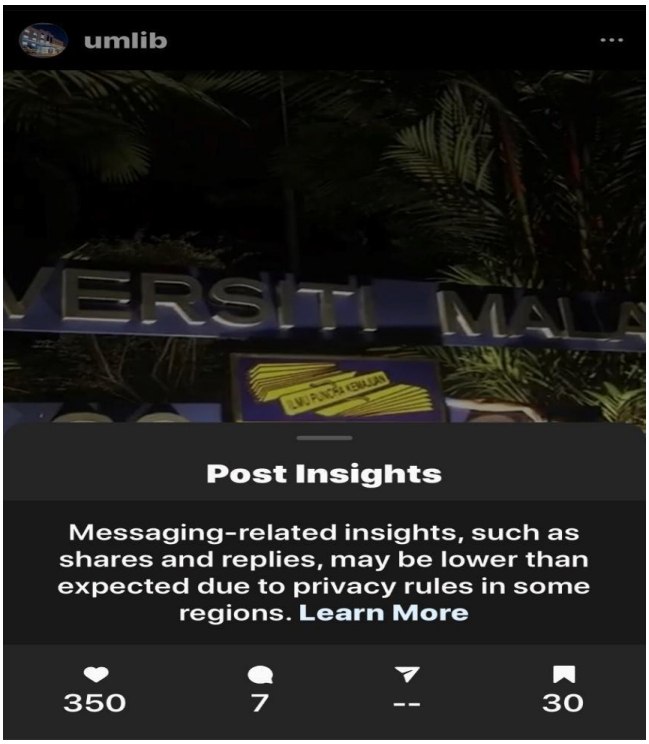

Figure 5: Screenshot of Top Post for Instagram

CONCLUSION

The results of this study are consistent with previous researches where social media in academic libraries is primarily used to promote its collection, services and facilities (Ayu & Abrizah, 2011; Hendrix, Chiarella, Hasman, Murphy, & Zafron, 2009; Omeluzor, Oyovwe-Tinuoye, & Abayomi, 2016). Since social media platforms have a wide reach and do not involve much overhead cost except for time and existing manpower to manage the platforms, it is considered to be a cost-effective method of marketing.

Based on the findings of this study, the following recommendations are listed for consideration:

1. While social media provides an easy channel for communication, strategies for engagement are important especially in the current state where there is unlimited content available on the internet that are capable of captivating audience with intriguing topics. Instead of using social media sites as electronic notice boards to promote library services and facilities routinely, it might be better to strategize an effective marketing plan. Important factors such as media type and narratives that are appealing to the crowd should be considered in order to avoid posting frequent bland and sterile postings which would not engage the audience in anyway or have less than average engagement.

2. Another important point to note is that video is now the preferred medium and if it is not incorporated in the content, then a lot of engagement opportunities will be missed. The results show that it need not have to be a corporate style or professional video to make an impact. A short video clip taken using a smartphone that is natural and yet relatable leaves a better impression on the audience.

3. It is recommended to provide different content for Facebook and Instagram even though these platforms are sharing the same goals and objectives. A content that works well on Instagram may not work well on Facebook and vice versa. Furthermore cross posting or providing exactly the same content across networks are known to annoy the audience (Tandon, 2021). Hence, it can be overwhelming having to create authentic and fun content which are engaging regularly across different platforms of social media. Having a team of members who are committed to manage the social media platform would be a better alternative so that there is a variety of fresh ideas. Scheduling the content ahead of time can also be beneficial to take off the pressure of having enough content to keep the platform active. However, there are considerable discussions among researchers that higher frequency of posting did not necessarily correlate to high engagement rate (Penaflor, 2017; Lam et al, 2019). It could also be detrimental when users become overwhelmed with information and tend to withdraw from the social media participation. This condition is known as social media fatigue (Dhir, 2018).

4. Both Facebook and Instagram are constantly updated and fixed. By using new and exciting features such as Stories and Reels in Instagram have shown that more audience are engaged. Stories in Facebook which are designed to capture current topics and happenings have a 24-hour lifespan and are not affected by the Facebook algorithm. However, there is a need to post at least once a day to ensure the story icon remains visible in the feed. A recently launched features of Instagram, Guide may also be used. This new feature provides users with an easier way to share helpful recommendations in a step by step format which may suit the library instructional information. Initially this

was enabled by Instagram to provide resources for people who are struggling with the pandemic.

5. Since most people are likely to be at home because of COVID-19 especially when mortality rates are high, now is a good time to reach out to users virtually. By creating dialogue and building relationships through online communication can help people to stay connected. Studies have shown that connecting with others during lockdown is a great way to care for our wellbeing. Online communication can help us maintain a sense of normalcy and a much needed remedy for beating the isolation.

6. Instagram only keep insight data for the past 30 days while Facebook Analytics will no longer be available after 30 June 2021. These free analytical tools can cease operation at any point of time so it is recommended to monitor and record the performance monthly so that informed decisions can be made based on users' engagement and content preferences. The results also cast a new light on the opportunity of focusing on Instagram to engage with users and targeting more followers particularly among Gen Y and Gen Z since the total currently is less than 2K.

This study has examined the Facebook and Instagram content of the UML during the pandemic. The findings show that the postings are largely based on 'library services/facilities/collection' promotion but 'community building' category has the most engagement. Instagram users are more receptive when it comes to 'information/knowledge sharing' posts. Video is the preferred media type currently. While Facebook has more followers, users are more engaged in Instagram.

This study had only focused on the Facebook and Instagram platform of the UML. It fulfills the need to look at users' engagement and how it can be further enhanced not only during the pandemic but also beyond the COVID-19 period. Unlike other previous researches, this paper has touched upon the use of recent app in Facebook and Instagram such as Reels, Stories, Live and Tik Tok. It is suggested that the results be reinforced by replicating the study on a larger sample. Further comparative study with other university libraries in the country can be explored by similar method as well as adding a survey or interview to gather users' perception of the libraries' social media.

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