Content Analysis of Engineering LibGuides

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Abstract

LibGuides has become one of the most widely used software for the display and access to information in academic libraries. The many technical characteristics and options of this content management system provide engineering librarians with several options, and the easy-to-use architecture allows for utilizing these options after a short training period.

In this paper, using well established bibliometric techniques the author analyzes the major characteristics, features and contents of a selected number of electrical and mechanical engineering LibGuides. Also, the selected LibGuides are subject to an assessment based on the criteria for the evaluations of LibGuides as presented in a recent work published by Whitfield and Clemens.[1] The results of the study are summarized in these areas: Main page characteristics, tabs and boxes used, most common databases, e-book resources, patents resources, technical reports resources, reference resources and others. Further, LibGuides are analyzed in two aspects: quality of technical design quality and quality of pedagogical design.

Introduction

Content analysis is used extensively in the social sciences, with the development of Web 2.0 technology it is used for analysis of web-based content. Examples of work done in this active area of internet research are: Kim and Kuljis[2] that studied the cultural differences in the design of blogs that have been produced in South Korea and the United Kingdom; Bauer and Scharl[3] proposed methodologies for the automated evaluation of Web sites; and Adams and McCorkindale[4] studied the use of Twitter by presidential candidates. Nevertheless the allied health sciences, marketing and many other areas also benefit from this research technique. In Library and Information Science, content analysis has produced extensive literature; a search in the database *Library, Information Science & Technology Abstracts* using the Subject term *content analysis* produced 682 citations during the years from 2000 to 2014, 490 of them were published in academic journals. It is indeed a well accepted technique for the analysis of library web sites, library operations, library collections, for the evaluation of journals, and for many other uses. This methodology has been used in two recent papers related to science STEM related LibGuides: Stankus and Parkera[5] on nursing and Dougherty[6] on geology LibGuides.

LibGuides a content management system developed by Springshare has been on the market since 2007, it is an effective software for the display and access of information in academic and other types of libraries. The many modern features of this product also provide engineering librarians with multiple design options, and the easy-to-use architecture allows for utilizing these options after a short training period. In 2010 at the ASEE Annual Conference, Bernier[7] presented a paper at an ELD sessions about this relatively new product, at that time, with Web 2.0 design capabilities and said: *"LibGuides is a robust content management system containing a variety of integrated Web 2.0 services designed specifically for libraries. By integrating these services with the library's information resources' points of access, librarians can create an environment that allows users to interact directly with the library staff."* The author then discussed the

friendly nature of the collaborative content management system, the numerous types of design features available for displaying information resources, and the capability for user interaction.

Many other aspects of this product have been discussed in the literature, Stitz, Laster, Bove, and Wise[8] described the process of moving from static web-based subject guides that are difficult to maintain to the implementation of LibGuides; and at a 2013 Higher Education Technology Agenda (THETA) Abalo[9] showed the specialized guides developed by the staff at Victoria University such as : Law, Library Orientation, Library Newsletter, Offshore Students, Referencing & Plagiarism, and Research Ambassador Support (a mentoring service). The utilization of LibGuides for reaching out to distance learning students and faculty was presented by Roberts and Hunter[10] with a particular focus on guides for class related library instruction sections taught by the librarians; and Adams and Horne[11] presented the results of surveys targeting faculty members, students, and library guide authors with the purpose of evaluating the service at Purdue University and Princeton University. The results were positive indicating a high level of acceptance by the faculty members and students; while the library staff appreciated the tools and features available.

Purpose

The first purpose of this paper is to analyze the major characteristics, features and content of a selected number of electrical and mechanical engineering LibGuides. The results will present the main page characteristics: tabs and boxes used, the list of most common databases, e-book resources, patents resources, technical reports resources, reference resources and other resources for these two engineering areas.

The second purpose is to make an assessment of the selected guides using the criteria for the evaluation of LibGuides as presented in a recent work done by Whitfield and Clemens.[1] The analysis is done by using three selected criteria for both the technical design quality and pedagogical design quality of the LibGuides.

Methods and Data Collection

Two important issues are discussed in this section. First, the method used for the selection of the LibGuides chosen for this study and second the selection of criteria for the assessment of the guides.

Selecting a relatively small number of LibGuides represented a challenge, the LibGuides Community site of Springshare <http://libguides.com/community.php> reported that on 01/04/2014 403,285 guides produced by 62,906 librarians have been published. The use of the search engine provides the listing of either electrical or mechanical engineering pages without a focus. After navigating though these results, it was clear that some parameters were needed. Electrical and mechanical engineering LibGuides from ABET accredited programs that offered at least a Master's level program in these disciplines were the parameters selected for identifying LibGuides.

The first step was to identify ABET schools; this was accomplished by generating a list of accredited programs for both disciplines from the ABET web site < http://www.abet.org/>; their

Find Accredited Programs search engine was used for this purpose. Data was collected in a Microsoft Excel file in the following order: Accredited ABET schools; this list was matched to whether or not LibGuides were maintained at each institution; next, specific electrical or mechanical engineering LibGuide links were determined. Any institutional website with specific subject LibGuides (electrical or mechanical) were further examined to determine the graduate level offerings; those that have at least a Master's degree offering were selected. Random samples were used to make the sample more manageable, and the geographical location was limited to United States institutions.

The methods for the assessment of the LibGuides was done by following the approach presented in two chapters of the book published by Dobbs, Sittler, and Cook.[12] In this work, Bielat, Befus, and Arnold[13] discussed the integration of LibGuides into the teaching and learning process and a set of pedagogical and learner-centered design principles. Whitfield & Clemens[1] defined criteria for technical design evaluation as well as presented a set of criteria for reference/educational evaluation. In the section on Results of this article these set of criteria will be further discussed.

In order to determine the main characteristics of electrical engineering and mechanical engineering LibGuides and their content, data was obtained by direct observation of their main pages, all the boxes and all the tabs. Each LibGuide was taken as a unit of analysis; a complete analysis was done to determine the design and space distribution of the home page, the headings used in tabs and boxes, the use of technological devices (widgets, links, multimedia), colors and signs included and many other details usually present on a page. After an extensive initial browsing of the pages, a novel classification scheme was developed. This was needed because there is no such scheme for subject guides, but many of the elements included are found in studies that describe web pages and subject guides. These are the elements selected for tabs, with a short definition:

Books - databases with e-books, the online catalog, or listings of important books.
Citing sources - access to data management software, pages for reference citing styles.
Home - the LibGuide default front page.
ILL - document delivery service for books, articles and other documents.
Journals - databases with e-journals, citation linker (SFX and others), lists of subject related journals.
Main subject resources - includes databases with journals, books and many other resources.
Patents - lists of databases for patents, help pages for patents.
Properties - material properties (only found in ME).
Reference resources - lists of core reference sources, databases with e-reference sources.
Reports - lists of databases for reports, help pages for reports (including paper reports).
Societies - listings of societies and associations.
Standards - lists of databases for standards, help pages for standards (including paper standards).
Websites - an assorted list of web resources.

These are the elements selected for boxes, with a short definition:

Ask-a-Librarian - widgets with e-mail, chat, and texting (used in ME).
Books - databases with e-books, the online catalog, or listings of important books.
Chat service - widgets with e-mail, chat, and texting (used in EE).
Citing sources - access to data management software, pages for reference citing styles.
Core databases - usually access to the top databases for ME or EE.
Dissertations - lists of databases for dissertations, help pages for dissertations (including the catalog).
Journals - databases with e-journals, citation linker (SFX and others), lists of subject related journals.
Librarian's contact - LibGuide's space for the page's owner.
Navigation help - gives directions about how to use the LibGuide.
Related guides - Guides that offered additional information (subject guides, tutorial guides, etc.).
Research ideas - lists of sources where students can find ideas for their projects.
The catalog - the library's catalog and others such as WorldCat.
Welcome - provides a welcome message to users.

This classification scheme was applied to every single page, in this process, labels used for presenting these materials, services and others, were collected. The labels in Table 1, 2, 11, and 12 demonstrated a variety of terminology used, which may be due to the local (campus) culture, the preference or background of the page's owner, or to some pre-established terminology used in a library.

There was a good number of tabs and boxes that were found only on one page, those were grouped under "Others." Nevertheless, this is another indication of the diverse possibilities available in LibGuides, the need for local coverage, and the creativity used by the librarians to make the guides more interesting and usable.

Results

A content analysis of web sites usually generates a large amount of data. These are the results included in this section: General characteristics of guides studied, Electrical Engineering (EE) LibGudies: Tabs; Boxes; EE Databases; EE Journals and Conference Papers Collections; EE Patents and Standards Resources; EE Reports; EE Reference and Books Collections; EE Reference and Books Collections; EE Products, Properties, and Other Resources; and EE Citation Manager Software and Dissertation and Theses Databases. Mechanical Engineering (ME) LibGudies: Tabs; Boxes; ME Databases; ME Journals and Conference Papers Collections; ME Patents and Standards Resources; ME Reports; ME Reference and Books Collections; ME Reference and Books Collections; and ME Properties and Methods.

General characteristics
To study the general characteristics of EE and ME LibGuides, 48 and 46 guides respectively were randomly selected from the original 310 total that met the criteria for selection indicated in the previous section. A standard random formula was used for this purpose. Table 1 (Appendix A) shows the number of boxes, tabs, contact information boxes (bio), search engines, and chat widgets available in each guide. The columns with the label "Guides" indicate the randomly-

selected guides; the average number of each's general characteristics is listed in the last row of Table 1.

In summary, the average numbers with the highest and lowest values in parenthesis for EE are: boxes = 5.05 (9 and 1), tabs = 5.73 (21 and 1), bio = 0.94 (2and 0), search = 0.33 (2 and 0), chat widgets = 0.29 (1 and 0). For ME: boxes = 5.15 (10 and 1), tabs = 5.48 (20 and 0), bio = 0.87 (2 and 0), search = 0.32 (2 and 0), and chat widgets = 0.24 (1 and 0).

Electrical Engineering (EE) LibGudies

In order to make the data collection manageable for the following sections, the number of LibGuides was further reduced to 22 for each subject. This number represents about 7% of the LibGuides that initially had the criteria for selection. The random process of selection in data collection can provide a realistic representation of the total population and is a method normally used in data collection[14]; this tool is used for data collection specifically when the content analysis has the potential of producing a staggering amount of data. Appendix B shows the list of the institutions.

EE Tabs

Eleven main areas were found. EE tabs tend to be mostly focused on providing context, although a portion of them are usually dedicated for other library services. The labels shown in the "Labels used" column were not modified, only the name of the institution was not included if it was part of the label.

Table 2. EE most common tabs

Topic	**Labels used**
Main subject resources	Databases/Research Databases/Find Articles/Journal databases/ Find Journals/ /Articles/Journal Articles/Article Databases/Articles and Databases/I need to Find...(Article/Databases -- Books)/ Start your Research/Databases and Books/Articles/ Electrical Engineering & Computer Science Resources/Databases (Articles and More)
Reference resources	Electronic Reference Books/ Reference Sources/Reference Materials/ Reference Sources-Communications & Signals/Reference Sources -Computers & Electronics/Reference Sources -Energy & Power
Books	Find Books/eBooks/ Books/Books and E-books/ I need to Find...(Article/Databases -- Books)/E-Books/ Ebooks/ E-Books Databases/Electronic Books/Print books/
Citing sources	Citing Sources/ Using RefWorks/ Data Management/Managing your citations/Citing Sources/ EndNote
Patents	Patents/ Find Patents/ US Government Documents and Patents
Standards	Standards/ Find Standards
Home	Home/Getting started/Articles databases/Overview
Journals	Electronic Journals/Journals/IEEE Journals
Web sites	Free Web Resources/Websites/Websites
ILL	Interlibrary Loan/ Using Interlibrary loan
Societies	Societies and Organizations/Associations and Careers

Other tabs used:

Alerts and RSS Feeds; Avoid Plagiarism; Collection policy; Contact a Librarian (chat); Electrical Engineering Basics; Faculty Resources; FAQ; Find Conferences; Helpful Tools (library); Intellectual Property Issues in Engineering; Intellectual Property; MATLAB; Mobile Apps; News Resources; One Search; Other resources; Publication Types; Publishing; RCR and Ethics; Web Sites; Web Resources; Research Assistance (library); Research help; Safety/MSDS Sources; Society News Feeds; Software and Programs; Tutorials/Database tutorials; Using FindIt; and Using Knovel.

EE Boxes

Ten major areas were found in EE guides. Boxes usually provide a mix of access to context, library services, campus services, chat services and a box for librarian's contact. The labels shown in the "Labels used" column were not modified, only the name of the institution was not included if it was part of the label.

Table 3. EE most common boxes

Topic	**Labels used**
Welcome	Welcome/ Electrical and Computer Engineering Resources/ Home/ Electrical and Computer Engineering/welcome to the EE Subject Guide/LibGuides for Electrical Engineering
Librarian's contact	Subject Guide/*name* Librarian/Librarian's name only/Help with Research/Engineering and Mathematics Librarian/ Librarian/ Reference Librarian/Head Librarian *name*/My profile/*name* Liaison Librarian/Subject Librarian/Meet your Librarian/Research Librarian/ Assistant Reference Librarian
Core databases	Databases/articles and databases/Index & Abstract Databases/Recommended Databases/ Electrical Engineering Journal Articles/ECE Databases/Electrical Engineering databases/ Primary Databases/ Finding Print and Electronic (Online) Articles
Navigation help	In this guide/how to use this guide/ Electrical Engineering/ Guide Navigation (of site)/ Getting started/ article Database Quick Links/ Getting Started at the library/Essentials
Journals	Journal Collections/Articles/Electrical Engineering Journal collections online
Books	E-book Database Quick Links/ New ECE books & Resources/ Finding Manuals, Handbooks & Books/ Selected Books for Electrical & Computer Engineering/ E-books/ECE Books
Chat service	Chat with us/Chat with a Librarian 24/7/ Ask a Librarian/Ask at the Desk/
Citing sources	Citation Help/Manage your References
Dissertations	Dissertations and Theses
Related guides	Related guides/Related Research Guides/Related Subject Pages/ Related Subject Guides

Other EE boxes

Find Journals (Citation Linker), Programs & Languages, Special Topics Subject Pages, Keeping up with Research, Library Services Quick Links, Need help?/ Help with Library Services, Sample Journals, Web Resources, Getting full text, Univ. Resources, Organizations, ECE book Browsing Guide, Library Reserves, Other services, Writing Help, Research Paper Wizard, SELBlog, Sciences-Engineering Library News, *name* Library News, Library News, *Name* Library Blog, Current Awareness Tools, Electronic Engineering News Digest, EE Times News/ Electrical Engineering at the Univ., From Off Campus, BrowZine, Research next steps (library), Schedule an Appointment, Recently Published Articles by Faculty, Search the Web, Google

Scholar, Search Online Catalog, Workshops and Tutorials, Recommendation for Library Purchase/Purchase Requests, Tell Us What You Think (feedback), This Page (feedback), This Tab (feedback), Online Catalog Search Plus, Find it @ *name*Univ, Univ. Quick Links, News Feeds, and Credits (site master).

They can be broadly grouped as boxes for tutorials and help tools, library services, asking for users feedback, resources available at the university and awareness services, no effort has been made to clearly identify and group them accordingly because most of the labels are self-explanatory.

For the purpose of evaluating the home page, tabs and boxes (see section on assessment) attention was paid to technical and pedagogical aspects. Examples of technical aspects are: the home page was well organized, the appropriate use of headings, and the appropriate use of space (not too crowded, too many tabs, etc.). Examples of pedagogical aspects considered are: the page has a clearly defined audience, there are options (boxes or tabs) with material to address multiple learning styles, and access to resources is made trough different types of technology (widgets, hyperlinks, etc.).

Electrical Engineering Resources in LibGuides

Gathering data for EE resources was done by accessing every single tab and box available in the main page of each guide. The listing of sources was collected in a Word file, only the main title of each item was kept. No attempt was made to keep a count of titles found but as the gathering of data was in process the most used sources were identified. This process was particularly important for database, journals and conference papers collections, and for reference and books collections. Individual reference works were collected but they are quite numerous, therefore, are not included. Finally, these listing are not intended with the purpose of providing the complete bibliographic record of each title; instead the emphasis is to provide concise information.

Table 4. EE databases

Core	**Others**
INSPEC	Academic Search Premier
Compendex/Engineering Village	Access Science
IEEEXplore	ACM Online Guide to Computing Literature
Web of Science	Annual reviews
SPIE Digital Library	Computer Science Index
ACM Digital Library	CSA Technology Research Database
Scopus	DSpace@MIT
arXiv.org e-Print archive	EEM.com
ScienceDirect	Energy Citations Database (DOE)
ProQuest Engineering Enhanced	Google Scholar
ProQuest Electronics & Communications Abstracts	Materials Research Database with METADEX
CSA Electronics & Communications Abstracts	Microsoft Academic Search
Computer and Information Systems Abstracts	ProQuest Theses & Dissertations
Applied Science & Technology	PubMed
	SciFinder
	Water Resources Abstracts

Table 5. EE journals and conference papers collections

Core	Others
Academic Search Complete ACM Digital Library Applied Science and Technology Full Text Computers and Applied Sciences Complete CSA Engineering Research Database Electrochemical Society Digital (ESC) Library IEEE Xplore IET Digital Library Optics InfoBase Journals (Optical Society of America - OSA) ProQuest Research Library SIAM Library Online SPIE Digital Library	American Society of Agricultural and Biological Engineers (ASABE) Technical Library . American Society of Civil Engineers (ASCE) Conference Proceedings ASFA: Aquatic Sciences and Fisheries Abstracts CAB Abstracts (Ebsco) Conference Proceedings Citation Index Odysci PapersFirst . WorldCat Classic

In Appendix C the complete context of other important resources are listed in the following tables: Table 6 EE patents and standards resources; Table 7 EE reports; Table 8 EE reference and books collections; Table 9. EE products, properties, and other resources; and Table 10 EE Citation Manager Software and dissertation and theses databases.

Mechanical Engineering (ME) LibGudies

Twelve main areas were found. ME tabs tend to be mostly oriented in providing context, although a portion of them are usually dedicated for other Library services. The labels shown in the "Labels used" column were not modified, only the name of the institution was not included if it was part of the label.

ME Tabs

Table 11. ME most common tabs

Topic	Labels used
Main subject resources	Databases/ Articles & Databases/Articles/Research Databases-Find Articles/Find Articles/Databases (Articles and more)/Databases and Catalogs
Reference resources	Electronic Reference Books/ Getting Started/ Reference Sources/ Handbooks & Manuals/Digital Libraries/Reference Tools/ Dictionaries and encyclopedias
Books	Find Books/books /Books/ Find Books and Dissertations/Books & eBooks/ Ebooks Textbooks
Journals	Find Journals/Electronic Journals/Journals/Journals & eJournals
Citing sources	EndNote/ Citation/citation management/Citation Helper/ Citation Assistance/ RefWorks/ Tools & Tips/Managing your Citations/Writing & Citing/ Frequently Ask Questions/Citation Sources
Home	Home/Start here/Getting Started

Patents	Patents/Find Patents
Standards	Standards/Find Standards/ ASME & Standards/Standards
Web sites	Websites/ Related Links/Web Resources/Organizations & Websites/associations and Careers
Properties	Properties, Spectra, MSDS/ Properties
ILL	Interlibrary Loan /Getting Articles
Reports	Technical Reports/ SAE Technical Papers

Other tabs used:

Alerts & RSS Feeds, Avoid Plagiarism, Business Resources, Contact a Librarian, Data Management, Dissertations, Faculty Resources, Find Conferences, Governmental Resources, Intellectual Property, Knovel, Mathematical Statistics, Mobile Apps and Sites, New Books, OneSearch, Other Resources, Proceedings, Professional organizations, Programming, Publishing, Research Assistant, Research help, Safety/MSDS Sources, Societies, Societies and organizations, Software, Specialized Guides, Theses & Dissertations, Tutoring, US Government Documents and Patents, Videos, Writing Help, Manufacturing Systems Class, and Process Engineering Class.

ME Boxes

Ten major areas were found in ME guides. Boxes usually provide a mix of access to context, library services, campus services, chat services and a box for librarian's contact. The labels shown in the "Labels used" column were not modified, only the name of the institution was not included if it was part of the label.

Table 12. ME boxes

Topic	**Labels used**
Core databases	MEMS Online reference resources/Index & Abstract Databases/ Mechanical Engineering Databases/ Search the Core Engineering Resources/ Finding articles & research papers/Find Articles/Main Engineering Article Databases/ Databases
Librarian's contact	Your Librarian/subject guide/"Librarian's name"/Ask Me/Help with Research/"Subject" Librarian/Your Librarian/Librarian/Reference Librarian/Engineering Librarian/Library Contact/none/Subject Guide-My Profile/Subject Guide/ME Liaison Librarian/Your Librarian/Research Librarian
Books	Find books/Mechanical Engineering eBooks/Books/ Key resources/Books, handbooks, theses/ MEMS Books @ the Library (new books)
Journals	Find journals/Journal Collections/E-Journals/Journal Articles/Articles/ Articles
Welcome	Welcome/ Mechanical Engineering/Introduction/Mechanical Engineering Resources/Mechanical Engineering/Library Help/ Starting Point for Aerospace Engineering Research/Major Databases
The catalog	Catalog Search/ Search Library Catalog/essentials /Catalog - Search Plus/ Beyond the Catalog
Research ideas	Research Projects/ Research Toolbox/ Keeping up with Research/Engineering research/Mechanical Engineering News from GlobalSpec/ News from Institution of Mechanical Engineers
Navigation help	In this guide/Overview/ Need help?/ Tips & Tricks/ Guide Contents/ Purpose of This Guide

Related guides	Related Guides/related Research Guides/LibGuides for Engineering
Ask a librarian	Ask A Librarian/Ask a Question

Other ME boxes

Accessing from Off Campus?, ASME Press Releases, Career Resources, Classes to Help (BI)/ Workshops and Tutorials, Class-specific Guides, Contact Us, Course Reserves, Credits (to web master), Engineering Library, Engineering Library Hours, Feedback/Tell Us What you Think, From Off Campus, Google Scholar, Help Guides, Library Blog, Library Doesn't Have What I Need- ILL, Library News, Library Quick Links, Library Reserves, Link me up (suggested sites), Looking for standards?, Manage your References, Mechanical Engineering at the Univ., Need Patent information, Open Access Sources, Professional Societies, Recommendation for Library Purchase/ Purchase Request, Related Databases, Sample Journal, Social Media, Society publications, Special Topics Subject Pages, Study for the NCEES Exams (aka FE Exams), Training Materials, Univ. Mechanical Engineering Department, Univ. Resources, VPN Reminder, Wait - It's not Full Text!, and What is Mechanical Engineering.

These boxes included information about BI and help guides, Library news, ILL and Reserve services, University support services, news about professional topics, and asking for users feedback, no effort has been made to clearly identify and group them accordingly because most of the labels are self explanatory.

Mechanical Engineering Resources in LibGuides

Gathering data for ME resources was done by accessing every single tab and box available in the in the main page of each guide. The listing of sources was collected in a Word file, only the main title of each item was kept. No attempt was made to keep a count of titles found but as the gathering of data was in process the most used sources were identified. This process was particularly important for the collection of databases, journals and conference papers collections, and for reference and books collections. Individual reference works were collected but they are quite numerous, therefore, are not included. Finally, these listings are not intended with the purpose of providing the complete bibliographic record of each title; instead the emphasis is to provide concise information.

Table 13. ME databases

Core	**Others**
Annual Reviews	Academic Search Elite
Applied Science & Technology abstracts	Access Engineering
arXiv.org	Applied Mechanics Reviews.
Compendex/Engineering Village	Applied Science and Technology Full Text
Digital Dissertations and Theses	CSA Aerospace and High Technology Database
Engineering Information Village	CSA Technology Research Database
IEEE Xplore	Environment Complete
IEEEXplore	ETDE World Energy Base
INSPEC	GreenFILE

Materials Research Database with METADEX	IAEA / INIS
METADEX	NTIS
SAE Digital Library	One Petro
Science Citation Index Expanded	ProQuest Engineering Enhanced
SciFinder	ProQuest Mechanical & Transportation Abstracts
Scopus	Shock & Vibration Digest.
Web of Science	TRID: Transportation Research and International
Web of Science	Transport Research Documentation

Table 14. ME journals and conference papers collections

Core	**Others**
American Society of Agricultural and Biological Engineers (ASABE) Technical Library	AIAA Electronic Library
American Society of Civil Engineers (ASCE) Conference Proceedings	AIAA Meeting Papers
ASME Conference Proceedings.	Applied Science Full Text
ASME Digital Library	Begell Digital Library
ASTM Standards and Engineering Digital Library	CSA Technology Research Database
Conference Proceedings Citation Index	INCE Digital Library
IEEE Xplore	Materials Science Journals, SAGE
SAE Digital Library	MRS Online Proceedings
SAE Technical Papers	PapersFirst
ScienceDirect	Ebsco Business Source Complete
SpringerLink Engineering Journals	American Institute of Physics (AIP) Online Conference Proceedings
Wiley Online Library	

For the purpose of evaluating the access to resources (see next section) attention was paid to technical and pedagogical aspects. Examples of technical aspects are: the graphical design of a page for databases was relevant, clear, and easy to read; the navigation from the home page to this page was consistent with the navigation to other core resources; and the design of the page was appropriate for the audience. Examples of pedagogical aspects considered are: resources on a page have a short, clear description; some search tips, tutorials are made available; and different types of resources are presented in a way that made sense (databases, journals, reference titles, etc.). This process was applied to both EE and ME resources.

In Appendix D the complete context of other important resources are listed in the following tables: Table 15 ME patents and standards resources, Table 16 ME reports, Table 17 ME reference and books collections, Table 18 ME properties and methods. The list of ME resources for Citation Manager Software and dissertation and theses databases are the same as for EE which the reader can find in Table 10.

Assessment of EE and ME LibGuides

Two set of criteria were chosen for this study: technical design criteria and pedagogical criteria. They are borrowed from the work done by Whitfield and Clements.[1] In their study of selecting best LibGuides, they defined eight areas for the evaluation of the pedagogical aspect of LibGuides and also defined seven areas for the technical design aspects of LibGuides. In this project three of each of those criteria were chosen for the assessment of engineering LibGuides.

Whitfield and Clemens[1] have made a clear exposition about how they generated criteria for determining a good pedagogical design of a LibGuide. Their guidelines was generated by examining the library standards of several organizations such as the Reference and User Services Association and the Association for College and Research Libraries particularly those related to virtual reference, remote services, and information literacy and taking into consideration different learning styles. All this information was compiled into eight categories: presentation/interest, access to resources, research skills, information literacy, scaffolding, blended learning, follow-up, and assessment. For this study, three of these categories were selected: presentation/interest, access to resources, and scaffolding. The definition and characteristics of these three are:

Table 19. Reference/Educational criteria, Whitfield and Clemens[1]

PC1	**Presentation/Interest** - the overall look of the guide adds positively to its instructional value.
	Characteristics: User is attracted to the page. The point of the guide is clear. First page of the guide provides an overview
PC2	**Access to resources** - the guide takes advantages of available technology (embedded media, widgets, etc) to help guide patrons through library resources.
	Characteristics: Search tips and other aids are available for those who are using a resource for the first time. Use of media to address multiple learning styles. Options to obtain immediate assistance are available.
PC3	**Scaffolding** - Information on the guide is presented in a logical, connected sequence to support all learners.
	Characteristics: evidence that learning occurs in context and builds on prior knowledge. Examples provided are relevant. Audience is clearly defined.

In determining how to evaluate the technological design of a LibGuide Whitfield and Clemens[1] made an in-depth analysis of studies on websites evaluations with the assumption that the analysis techniques that have been applied to website can also be utilized for the technological evaluation of LibGuides. Seven categories were determined: Information architecture, navigation, text, graphics and interactive content, colors, links, and help and documentation. For this study, three of these categories were selected: Information architecture, navigation, and graphics and interactive content. The definition and characteristics of these three are:

Table 20. Technical design criteria, Whitfield and Clemens[1]

TC1	**Information architecture** - the overall design and organization of the LibGuide.
	Characteristics: Purpose of the LibGuide is defined. Audience consideration. Hierarchy of information is clear (Use of headings). Does not overly divide information.
TC2	**Navigation** - the interface and directional aids should logically assist the user to move around the LibGuide.
	Characteristics: Navigation is consistent throughout website. Multiple entry points for content

TC3	**Graphic and interactive design** - the graphical additions to the LibGuide should serve a specific purpose.
	Characteristics: Graphic design is relevant and has a clear focal point. Balance achieved by following the rules of thirds. Appropriate use of columns and white space.

Following standard procedures for the evaluation of websites, after criteria have been established a scale is defined. The scale serves the purpose of grading the level that each element of the criteria has been observed in the assessment process (Saha & Grover[15] and Bauer & Scharl[3]). A three level grading numerical system was created for this study: a. satisfies the criteria, 3 points, b. partially satisfies the criteria, 2 points, and c. minimally satisfies the criteria, 1 point.

Table 21 and Table 22 shows data collected for technical criteria (TC1, TC2, TC3) and for pedagogical criteria (PC1, PC2, PC3). The columns 1 to 22 represent the assigned values for each of the 22 selected LibGuides, see Appendix E.

Table 23. Summary of assessment

Subjects	Total points	Average value
EE TC	176	8.00
EE PC	156	7.09
EE Total	332	7.55
ME TC	174	7.91
ME PC	157	7.14
ME Total	331	7.52

Conclusions

This survey has provided some insights about the use by engineering librarians of LibGuides. In terms of general characteristics, it shows that the average number of tabs and boxes are about 5 or 6 for both subjects. Table 24 summarized the major areas included in the EE and ME tabs and boxes which indicates a high level of similarities. This table also suggests that research about defining the elements included in LibGuides would be beneficial.

Table 24. Summary of tabs and boxes

EE Tabs	**EE Boxes**	**ME Tabs**	**ME Boxes**
Main subject resources	Welcome	Main subject resources	Core databases
Reference resources	Librarian's contact	Reference resources	Librarian's contact
Books	Core databases	Books	Books
Citing sources	Navigation help	Journals	Journals
Patents	Journals	Citing sources	Welcome
Standards	Books	Home	The catalog
Home	Chat service	Patents	Research ideas
Journals	Citing sources	Standards	Navigation help
Web sites	Dissertations	Web sites	Related guides
ILL	Related guides	Properties	Ask a librarian
Societies		ILL	
		Reports	

This content analysis has produced a significant amount of data that can be utilized to compare the characteristics of similar LibGuides and also the context provided. The listings of resources identified for EE and ME shows both core and supplementary resources, they can be used to enhance our own LibGuides.

The assessment of the guides gives a broader indication that engineering librarians are effectively using the technical features offered by the software and that more research is needed to fully utilize the pedagogical capabilities of LibGuides.

For example when Technical design criteria 1 (TC1) information architecture is considered, the LibGuides must meet the following characteristics: the purpose of the LibGuide is defined, audience consideration, hierarchy of information is clear (use of headings), and does not overly divide information. In the scale of 1 to 3, nineteen of the EE guides were graded 3 and only three were graded 2; the same result was observed for ME guides. This is an indication that the technical properties of the software are well-used.

Nevertheless, in relation to criteria number 2 (PC2) of the Reference/Educational criteria (access to resources), the results show a lower grade. PC2 is defined as: the guide takes advantages of available technology (embedded media, widgets, etc.) to help guide patrons through library resources. PC2 characteristics are: search tips and other aids are available for those who are using a resource for the first time, use of media to address multiple learning styles, and options to obtain immediate assistance are available. In this case, the results show that for EE guides, twenty-one were graded 2 and one was graded 1. For ME guides, all the twenty-two guides were graded 2. This an indication that a better job can be done to present material to occasional users as well as to students with different learning styles.

This is not a comprehensive study about how to determine the content presented at subject LibGuides, and the methodology for assessment presented is only one of the first efforts for finding ways of evaluating the quality of this library service; more research needs to be done. Further, this paper focuses on content and aesthetics aspects, more needs to be done also in finding out for example how students are using LibGuides, what are good practices to incorporate this type of resource into the curriculum, and cost and benefit analyses.

References

[1] Whitfield, Sharon & Clemens, Claire. Showcase of exceptional LibGuides. In, *Using LibGuides to enhance library services*, Dobbs, A.D., Sittler, R.L., & Cook, D., eds. Chicago: ALA, 253-288, (2013).

[2] Kim, Inhwa, & Kuljis, Jasnas. Applying content analysis to web-based content, *Journal of Computing and Information Technology*, 18(4), 369–375, (2010).

[3] Bauer, Christian & Scharl, Arno. Quantitive evaluation of web site content and structure, *Internet Research*, 10(1), 31-44, (200)

[4] Adams, A., & McCorkindale, T. M. Dialogue and transparency: A content analysis of how the 2012 presidential candidates used Twitter. *Public Relations Review*, 39(4), 357-359, (2013).

[5] Stankus, Tony & Parkera, Martha A. The anatomy of Nursing LibGuides, *Science & Technology Libraries*, 31(2) 242-255, (2012).

[6] Dougherty, Kate. Getting to the core of Geology LibGuides, *Science & Technology Libraries*, 32(2) 145-159, (2013).

[7] Bernier, Richard. Using LibGuides as a WEB 2.0 Content Management System and a collaboration tool for engineering librarians. In, *ASEE Conference Proceedings, ASEE Annual Conference*, Louisville, KY, June 20-23, AC 2010-8 (2010).

[8] Stitz, Tammy, Laster, Shari, & Bove, Frank J., &Wise, Casey. A Path to providing user-centered subject guides, *Internet Reference Services Quarterly*, 16:183-198, (2011).

[9] Abalo, Pan. LibGuides - Not just subject and research guides. In, *THETA 2013, The Higher Education Technology Agenda*, Hobart Australia, April 7-10, Conference presentation, (2013). Available online: http://ccaeducause.files.wordpress.com/2011/01/pam-abalo.pdf http://theta.edu.au/program/ (Accessed January 4, 2014).

[10] Roberts, Sara, & Hunter, Dwight. New library, new librarian, new student: Using LibGuides to reach the virtual student, *Journal of Library & Information Services in Distance Learning*, 5:67–75, (2011).

[11] Adams, Steven & Horne, Angela. Do the outcomes justify the buzz?: An assessment of LibGuides at Cornell University and Princeton University. In, *ACRL14th National Conference*, Seattle, WA, March 12-15, 2009, Contributed Paper (2009). Available online: http://www.slideshare.net/smadams/do-the-outcomes-justify-the-buzz-an-assessment-of-libguides-at-cornell-university-and-princeton-university (Accessed January 4, 2014)

[12] Dobbs, A.D., Sittler, R.L., & Cook, D., eds. *Using LibGuides to enhance library services*, Chicago: ALA, (2013).

[13] Bielat, Veronica, Befus, Rebeca, & Arnold, Judith. Integrating LibGuides into the teaching-learning process. In, *Using LibGuides to enhance library services*, Dobbs, A.D., Sittler, R.L., & Cook, D., eds. Chicago: ALA, 121-142, (2013).

[14] Krippendorff, Klaus. Sampling, In, *Content analysis: An introduction to its methodology*, Thousand Oaks, CA: Sage Publications, 112-125, (2013).

[15] Saha, Rajeev & Grover, Sandeep. Quantitative evaluation of website quality dimension for web 2.0 envi ronment, *International Journal of u- and e- Service, Science and Technology*, 4(4) 15-35, (2011).

Appendix A

Table 1. General characteristics of ME and EE LibGuides

Electrical Engineering LibGuides						**Mechanical Engineering LibGuides**					
Guides	**boxes**	**tabs**	**bio**	**search**	**chat**	**Guides**	**boxes**	**tabs**	**bio**	**search**	**chat**
EEG1	3	3	1	1	0	MEG1	3	0	0	1	0
EEG2	3	9	1	1	0	MEG2	3	9	1	1	0
EEG3	7	4	1	2	1	MEG3	5	4	1	1	1
EEG4	5	6	0	0	0	MEG4	6	5	1	1	1
EEG5	4	4	1	0	1	MEG5	4	4	1	0	1

EEG6	9	2	1	0	0	MEG6	9	2	1	0	0
EEG7	8	5	1	0	1	MEG7	9	5	1	1	1
EEG8	8	3	2	0	0	MEG8	8	3	2	0	0
EEG9	6	6	1	0	1	MEG9	6	6	1	0	1
EEG10	7	21	1	1	1	MEG10	10	20	1	1	0
EEG11	4	12	1	0	0	MEG11	5	13	1	0	0
EEG12	7	7	1	0	0	MEG12	6	5	1	0	0
EEG13	6	6	1	0	1	MEG13	6	6	1	0	1
EEG14	6	7	1	0	0	MEG14	7	7	1	1	0
EEG15	4	5	0	0	0	MEG15	4	5	0	0	0
EEG16	6	6	1	1	1	MEG16	6	6	1	1	0
EEG17	7	5	1	1	0	MEG17	7	7	1	2	0
EEG18	3	3	1	0	0	MEG18	3	3	1	0	0
EEG19	7	4	1	1	0	MEG19	7	4	1	1	0
EEG20	4	8	1	0	1	MEG20	5	7	1	0	1
EEG21	3	4	0	0	0	MEG21	2	4	0	0	0
EEG22	6	3	2	1	1	MEG22	8	5	2	0	1
EEG23	7	3	2	1	0	MEG23	4	2	1	0	0
EEG24	5	5	1	0	0	MEG24	3	5	2	0	0
EEG25	9	7	1	0	0	MEG25	10	7	1	0	0
EEG26	4	4	1	0	0	MEG26	4	4	1	0	0
EEG27	9	10	1	0	1	MEG27	3	0	1	0	0
EEG28	3	0	1	0	0	MEG28	6	5	0	2	0
EEG29	7	5	0	2	0	MEG29	6	10	1	0	0
EEG30	5	6	1	0	1	MEG30	2	7	1	0	0
EEG31	4	11	1	0	0	MEG31	3	6	1	0	0
EEG32	2	7	1	0	0	MEG32	3	7	1	0	0
EEG33	4	6	1	0	0	MEG33	2	1	1	0	0
EEG34	2	1	1	0	0	MEG34	1	1	0	0	0
EEG35	3	9	1	0	0	MEG35	9	9	0	0	0
EEG36	1	1	0	0	0	MEG36	3	8	0	0	1
EEG37	7	9	0	0	0	MEG37	4	7	1	0	0
EEG38	3	6	1	0	0	MEG38	9	8	1	0	0
EEG39	4	10	1	0	1	MEG39	4	4	1	0	0
EEG40	1	6	1	0	0	MEG40	6	4	1	1	0
EEG41	4	4	4	0	0	MEG41	5	10	1	0	1
EEG42	8	5	1	2	0	MEG42	3	7	0	0	0
EEG43	6	9	1	1	1	MEG43	3	0	1	0	0
EEG44	2	0	0	0	0	MEG44	3	0	1	0	0
EEG45	9	4	1	1	1	MEG45	7	4	1	1	1
EEG46	4	7	0	0	0	MEG46	5	6	0	0	0
EEG47	3	0	1	0	0						
EEG48	3	7	0	0	0						
EE Ave	5.04	5.73	0.94	0.33	0.29	ME Ave	5.15	5.48	0.87	0.32	0.24

Appendix B

Institutions
The in-depth analysis of 22 LibGuides for each subject were performed. But the total number of institutions involved was 28 because not all libraries have EE and ME guides.

Bucknell University, Case Western Reserve University, Colorado State University, Duke University, Florida State University, Kansas State University, Massachusetts Institute of Technology, Missouri University of Science and Technology, Purdue University at West Lafayette, St. Louis University, Texas A&M University, Tufts University, University of Alabama, University of Arkansas, University of California, Los Angeles, University of California, Santa Barbara, University of Delaware, University of Florida, University of Iowa, University of Kentucky, University of Michigan, University of Mississippi, University of Nebraska - Lincoln, University of New Mexico, University of Wisconsin - Madison, Washington State University, Wright State University, and Youngstown State University.

Appendix C

Other EE Resources
In this appendix the full context of the following tables are presented: Table 6 EE patents and standards resources; Table 7 EE reports; Table 8 EE reference and books collections; Table 9 EE products, properties, and other resources; and Table 10 EE Citation Manager Software and dissertation and theses databases. Resources listed at least once are included.

Table 6. EE patents and standards resources

Patents	**Standards**
Canadian Intellectual Property Office Delphion Intellectual Property Network DEPATISnet information Espacenet European Patent Office Databases Free Patents Online Google Patents Industrial Property Digital Library Lexis/Nexis PAT2PDF Patent Fetcher Patent Lens PatentScope Reaxys SciFinder SciFinder (Chemical Abstracts) United States Patent & Trademark Office, Patent Database WIPO - World Intellectual Property Organization.	ASTM Standards ASABE Technical Standards IEEE standards- IEEEXplore Standards National Fire Code International Telecommunication Union (ITU-T) SAE Handbook - SAE Standards Standards Reference Directory ASCE standards ANSI standards US Military Standards & Specifications ASSIST Quick Search - Military Standards IHS Standards Expert SAE Digital Library

Table 7. EE reports

Directory of Online Technical Report Organizations
DTIC Online: Public Technical Reports
EECS Technical Reports
Energy Citations Database
Energy Technology Data Exchange World Energy Base (ETDEWEB)
E-print Network: Research Communications for Scientists and Engineers
NACA RM
NACA Technical Notes
NASA CP (Conference Proceedings)
NASA Technical Reports Server (NTRS)
NTIS National Technical Reports Library (NTRL)
NTRS: NASA Technical Reports Server
SAND
Technical Report Archive & Image Library (TRAIL)
TRIS Online (Transportation Research Information Services)

Table 8. EE reference and books collections

AccessEngineering
ASM Handbooks Online
Books 24x7
CRC EngNetBase
CRCnetBASE
Ebrary
Ebsco eBooks Collection
eFunda
ElectricalEngineerinGnetBASE
ENGnetBASE
IEEE Xplore E-books
IET Digital Library
Knovel Library
Momentum Press eBooks
Safari Technical Books Online
Safary Tech Books Online
SPIE eBooks
Springer E-books
SpringerLink Books on Electronic & Computer Engineering
Synthesis Digital Library of Engineering and Computer Science
The Materials & Mechanical Collection from Referex Engineering
Wiley Interscience Electronic Books

Table 9. EE products, properties, and other resources

Products: EEM.com Thomas Register (Thomas) FreeTradeZone.com Electronic Engineers Master Catalog (EEM) **Properties:** NIST Physical Measurement Laboratory: NIST Data Gateway Microelectronics Packaging Materials Database Materials Research Database with METADEX	**Others:** Circuits Archive eeProductCenter IC Master MEMSnet: MEMS and Nanotechnology Exchange MIT's Semiconductor Subway Octopart Optics.org Resistor Guide RF Cafe Integrated Circuit Identification McGraw-Hill circuit encyclopedia and troubleshooting guide The encyclopedia of electronic circuit

Table 10. EE Citation Manager Software and dissertation and theses databases

Citation Software	**Dissertation and Theses Databases**
BibText EndNote RefWorks Zotero Mendeley BibMe Son of Citation Machine	ProQuest Digital Dissertations database Networked Digital Library of Theses and Dissertations NDLTD University Repository ProQuest Dissertations and Theses-A&I ProQuest Digital Dissertations and Theses Networked Digital Library of Theses and Dissertations WorldCat Dissertations and Theses British Library EThOS Registry of Open Access Repositories (ROAR)

Note: this last table is also applicable to ME Resources.

Appendix D

Other ME Resources

In this appendix the full context of the following tables are presented: Table 15 ME patents and standards resources, Table 16 ME reports, Table 17 ME reference and books collections, and Table 18 ME properties and methods. Resources listed at least once are included. ME resources for Citation Manager Software and dissertation and theses databases are the same as for EE, see Table 10.

Table 15. ME patents and standards

Patents	**Standards**
Espacenet European Patent Office Free Patents Online Google Patents	ACI - American Concrete Institute, Standards AISC - American Institute of Steel Construction - standards ASABE Technical Standards

Indian Patent Information Retrieval System Japan Patent Office Japanese, Chinese or Korean Patent Help Lexis/Nexis Academic Patent Scope SciFinder United States Patent & Trademark Office, Patent Database US Patent Office WIPO - World Intellectual Property Organization	ASME Boiler and Pressure Vessel Code ASME Standards through Knovel ASSIST Quick Search - Military Standards ASTM Digital Library AWWA Standards through Knovel. Everyspec - Free military and other federal standards IEEE standards through IEEEXplore. IHS Standards Expert International Telecommunication Union (ITU-T) Military Specifications - The Department of Defense NASA Standards National Fire Code. Necplus OSHA & MiOSHA - Occupational Safety & Health Administration standards SAE Digital Library SAE Ground Vehicle Standards Society of Civil Engineers (ASCE). The Index of Federal Specifications, Standards and Commercial Item Descriptions University Standards Database

Table 16. ME reports

Aerospace and High Technology (CSA) Army Corps of Engineers Research and Development Center (CRREL) Defense Technical Information Center (DTIC) Department of Energy Information Bridge DTIC (Defense Technical Information Center) Technical Reports Energy Citations Database Environmental Protection Agency (EPA) ETDEWEB Information Bridge (U.S. Department of Energy) International Nuclear Information System (INIS) NACA Archive (UK Mirror) NACA Publications NASA STI Publications - STAR NASA Technical Report Server (NTRS) National Environmental Publications Information System (NEPIS) NTIS - National technical Reports Library (NTRL) NTRS: NASA Technical Reports Server Rand Publications SAE Digital Library Science Accelerator SciTech Connect Society of Manufacturing Engineers Database The NASA Astrophysics Data System ADS TRAIL--Technical Reports Archive and Image Library Virtual Technical Reports Center (U of Maryland) WorldWideScience.org

Table 17. ME reference and books collections

ASM Handbooks Online ASM Materials Information CRC ENGnetBase CRC Handbook of Chemistry and Physics CRCnetBase Ebrary EBSCO eBooks eFunda ENGnetBASE IEEE Wiley eBooks Library IET Digital Library Knovel Library MIT Press eBooks Momentum Press eBooks ProQuest Dissertations & Theses database SAE Digital Library Safari Technical Books Online	SPIE Digital Library Springer eBooks SpringerLink Books on Mechanical Engineering SpringerLink: Aerospace SpringerLink: Control Engineering SpringerLink: Mechanical Engineering SpringerLink: Theoretical and Applied Mechanics Synthesis Digital Library of Engineering and Computer Science ThermoDex: An Index of Selected Thermodynamic Data Handbooks Thermopedia. Begell House Thermophysical Properties of Matter. CINDAS Ullmann's Encyclopedia of Industrial Chemistry

Table 18. ME properties and methods

Properties: Aerospace Structural Metals Handbook ASM Alloy Phase Diagrams Center Online ASM Materials Information CES Edupack Chemical Engineering & Processing Portal (NIST) Chemical Information Material Safety Data Sheets, Environmental Health and Safety Online Chemicool ChemID Plus Hazmat Navigator Knovel Material ConneXion Merck Index OnlineMerck Index Online: NIST Chemistry WebBook NIST Data Gateway: NIST Physical Measurement Laboratory: Physical Properties Data Sources Structural Shape (Steel Aluminum), Engineer's Edge	ThermoDex: An Index of Selected Thermodynamic Data Handbooks Thermopedia, Begell House Thermophysical Properties of Matter Database (TPMD) Thomas Register of American Manufacturers (ThomasNet) ToxNet, National Library of Medicine TRC Web Thermo Tables **Methods:** Official Methods of Analysis of the Association of Official Analytical Chemists Standard Methods for the Examination of Water and Wastewater Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods (SW-846)

Appendix E

Table 21 and Table 22 shows data collected for technical criteria (TC1, TC2, TC3) and for pedagogical criteria (PC1, PC2, PC3). The columns 1 to 22 represent the assigned values for each of the 22 selected LibGuides.

Table 21. EE LibGuides assessment matrix

Criteria	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
TC1	3	3	3	3	3	3	2	3	3	3	2	2	3	3	3	3	3	3	3	3	3	3
TC2	3	2	3	2	3	3	2	2	3	3	2	3	3	2	2	3	3	3	2	2	2	3
TC3	3	3	2	3	3	3	1	3	3	2	3	2	2	2	3	2	3	3	3	3	3	2
T TC	9	8	8	8	9	9	5	8	9	8	7	7	8	7	8	8	9	9	8	8	8	8
PC1	3	3	3	3	3	3	2	3	3	3	3	3	2	2	3	2	3	3	3	3	3	3
PC2	3	3	2	3	2	3	1	2	3	2	2	2	2	2	2	2	3	3	2	2	3	2
PC3	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
P PC	8	8	7	8	7	8	4	7	8	7	7	7	6	6	7	6	8	8	7	7	8	7
Total	17	16	15	16	16	17	9	15	17	15	14	14	14	13	15	14	17	17	15	15	16	15

Table 22. ME LibGuides assessment matrix

Criteria	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
TC1	3	3	2	3	3	3	3	2	3	3	3	3	3	2	3	3	3	3	3	3	3	3
TC2	3	2	2	3	3	2	3	2	3	2	3	3	2	2	2	2	3	2	2	3	2	2
TC3	3	3	2	2	3	3	3	1	3	3	2	3	2	2	2	3	3	3	3	3	3	3
T TC	9	8	6	8	9	8	9	5	9	8	8	9	7	6	7	8	9	8	8	9	8	8
PC1	3	3	2	3	3	3	3	1	3	2	3	3	2	2	2	2	3	3	2	3	3	3
PC2	3	3	2	3	3	3	3	1	3	3	3	2	2	1	2	2	3	2	3	3	3	3
PC3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
P PC	8	8	6	8	8	8	8	4	8	7	8	7	6	5	6	6	8	7	7	8	8	8
Total	17	16	12	16	17	16	17	9	17	15	16	16	13	11	13	14	17	15	15	17	16	16