ICT INFRASTRUCTURE AND ELECTRONIC RESOURCE SERVICES IN CAPE ENGINEERING COLLEGE LIBRARIES OF KERALA: A SURVEY

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Abstract: - *The Co-operative Academy of Professional Education (CAPE) is an autonomous society under the Department of Co-operation, Government of Kerala and it was formed to establish Educational Institutions in various professional fields to provide facilities for Education and Training in Kerala. ICT infrastructure is an essential element in the modern library which plays a great role in the management of academic libraries. The use of ICT tools and infrastructure is invaluable in the mission of giving the right information in the right time to the right user satisfactorily.*

This is a study on the ICT infrastructure, electronic resources and other ICT related facilities in five Engineering college libraries which have completed ten years of service, out of nine Engineering colleges functioning under CAPE. The paper points out the facilities and limitations of ICT infrastructure and electronic resources in CAPE college libraries as well as suggesting necessary actions to be taken to improve the standing facilities and services in libraries.

Keywords : ICT infrastructure, Engineering college library, electronic resources, CAPE

1. Introduction

ICT is the various information technology tools used for managing data and information, or for processing, storing or disseminating data or information. ICT is an extensional term for information technology but it focuses primarily on communication technologies. Our interaction with digital world becomes possible by using information and communication technology and its tools.

ICT infrastructure is an essential element in the modern library which plays a great role in the management of academic libraries. Library consisted of four elements which were library resources, users, the building and the library professionals who relate all of the above. But today ICT has turned as a fifth element through

which information access is possible in a moment of time, and it also connects all the other elements of the library. The assumption that the library will not be complete or perfect without the first four elements has changed and now the assumption is that an academic library will not be complete or perfect without the facilities of ICT. Information and communication technology infrastructure has got a wide meaning that it is library resources, resource storage area, information access point, information processing machine etc.

The use of ICT tools and infrastructure is invaluable in the mission of giving the right information in the right time to the right user satisfactorily. ICT infrastructure facilities are essential for libraries now a days to systematize the library services to cope with the fast advancing society, by comprehending the five basic laws of library science. If the development of the libraries in the direction of satisfying the needs of knowledge based society has to become possible, proper preparation of soil with adequate water and light of new era is essential. This preparation in the modern era is done undoubtedly by ICT infrastructure. ICT infrastructure is the indispensable resources of today's libraries, the effective medium that connects the users with the resources, the criterion of the modernization and development of the library and the status symbol of the library.

With the advent of ICT, the conventional system of library operations and services have been subjected to great challenges and e- books, e- journals and other e- resources have became integral part of the library instead of or along with the stacked books and magazines in shelves in the library. The method of locating books and magazines by reading the book name and shelf number has changed and instead started searching with the tip of the finger by looking URL or DOI and users are now able to view and download whatever information they need. In this world of computers the libraries have to be very careful and attentive in acquiring ICT infrastructure and also in meeting use of the vast and unlimited possibilities and prospects of ICT.

CAPE Engineering Colleges

CAPE is an autonomous institution established in 1999 under the co-operative department of Government of Kerala with a view to providing the best facilities for professional education and training. The first institution under CAPE was the Co-operative Institute of Technology in Vadakara (Renamed as College of Engineering Vadakara in 2015) which was established in 1999- 2000 Academic year. Now CAPE has grown up to the level of a prestigious organization which directs nine Government controlled self financing Engineering colleges and one management institute in Kerala.

CAPE engineering colleges are situated in eight different districts in Kerala. Six engineering colleges in the five districts of south zone- Thiruvananthapuram, Kollam, Alappuzha, Kottayam and Pathanamthitta- and three colleges, one each in Kozhikode, Kannur and Kasargoad districts in north zone, Malabar region. In the CAPE colleges where there is an intake capacity

of 3075 B.Tech seats and 198 Post graduate seats in each year, the total strength goes beyond 12000 students, around 800 teachers, and other staff, are all users of the college libraries. The libraries of CAPE Engineering colleges possess their own wide library buildings and related facilities. They are fully automated with library management software and the users can enjoy the facilities by making use of the electronic resources as well as print resources.

Table-1. Engineering Colleges under CAPE

No.	College	Abbreviated as	District	Year of starting	U.G. Intake	P.G. Intake	
1	College of Engineering Vadaara	CE VDA	Kozhikode	1999	378	60	Colleges included in the study
2	College of Engineering Perumon	CE PRN	Kollam	2000	378	18	
3	College of Engineering Trikaripur	CE TKR	Kasargoad	2000	283	-	
4	College of Engineering Thalassery	CE TLY	Kannur	2000	441	48	
5	College of Engineering Kidangoor	CE KGR	Kottayam	2000	362	36	
6	College of Engineering and Management Punnapra		Alappuzha	2009	378	36	Not included in the study
7	College of Engineering Pathanapuram		Kollam	2011	315	-	
8	College of Engineering Aranmula		Pathanamthitta	2014	240	-	
9	College of Engineering Muttathara		Thiruvananthapuram	2016	300	-	
Total intake per year					**3075**	**198**	

Methodology

There are nine Engineering colleges functioning under CAPE. Only the colleges which have completed 10 years of functioning have been included in the domain of study. The colleges which have completed ten years are College of Engineering Vadakara, College of Engineering Perumon, College of Engineering Thrikkaripur, College of Engineering Thalassery and College of Engineering Kidangoor. This study is based on the libraries of these five engineering colleges. The study was conducted by collecting data directly from the librarians of each of these colleges by using a well structured questionnaire. Statistical tools are used for the analysis of data. This study is not applicable to other engineering colleges in Kerala or other institutions working under CAPE.

Objectives

- To assess the current status of ICT infrastructure facilities in CAPE engineering college libraries in Kerala
- To identify the available electronic resources and e-resource access facilities in CAPE Engineering colleges in Kerala
- To find out the status of web based services of CAPE engineering college libraries in Kerala
- To identify the status of library automation and digital library services in CAPE engineering colleges in Kerala
- To suggest suitable measures to improve the ICT infrastructure and e- resource services in CAPE engineering college libraries in Kerala

Limitations

The study is limited to engineering college libraries under CAPE.There are only nine engineering colleges under CAPEwhich come under the category of government controlled self-financing colleges. Study doesn't cover the CAPE colleges below the age of ten years. Only five engineering colleges have completed ten years.

Those Engineering colleges under CAPE which have not completed ten years, and other Engineering colleges that are working in Government/Govt. aided/ Govt. self financing/ Private self-financing sector do not come under the domain of the study.

Review of literature

Manjunathaand Shivalingaiah (2003)conducted study on information access in libraries which reveals that the libraries in developed countries are better equipped with technology to meet the challenges of information access as compared to those in developing countries. The study also says that developing countries face technological inadequacies to provide information access especially in digital format.

Jotwani (2014) conducted a study on trends in acquisition and usage of electronic resources at IIT libraries which shows that there is a clear shift in the collection development policies of IIT libraries where e- resources have become a

vital part of their core collections. Mohamed Haneefa's (2006) study on information and communication technology infrastructure in special libraries in Kerala revealed the ICT infrastructure facilities in special libraries in Kerala. The study underlines the fact that most of the users of these libraries are not satisfied with ICT based services due to the lack of adequate ICT infrastructure facility.

Sreenivasulu and Nagabhushanam (2013) conducted a study on the use of internet and online databases at National Institute of Fashion Technology, Kannur. They examined the use of internet, search engine and online databases and suggested the need of improving the facilities for the use of internet and online database for academic purposes. Tiwari and Sahoo (2011) conducted a study on importance and use of ICT in university libraries of Madhyapradesh. They found that the lack of proper planning and supervision and the frequent changes in technology have become an impediment in setting up of facilities successfully in the university libraries in Madhyapradesh.

The study conducted by Khan and others (2010) on the use of information technology tools in Dental, Engineering and Management colleges in Hyderabad reveals that the users of ICT tools are increasing day by day. Bingimlas (2009) in his study on barriers to the successful integration of ICT in teaching and learning environment points out with stress the lack of accessibility to resources.

Walmiki and Gowda (2009) points out the role of IT Infrastructure in facing the challenges of the new world in their study on Karnataka University libraries.The study of Praveen Kumar (2012) on the ICT based resources in the Engineering college libraries in Haryana shows that most of the users prefer electronic resources to other ICT related services.

Analysis and interpretation

Table- 2. Hardware infrastructures

Sl. No.	ITEM	CE TKR	CE TLY	CE VDA	CE PRN	CE KGR	TOTAL
1	Number of Computers						
	Automation and office work	3	4	4	3	4	18
	For library users	14	14	6	5	20	59
	Total	17	18	10	8	24	77
2	Server	1	1	1	1	-	
3	Printer	2	2	2	1	2	
4	Document Scanner	1	2	1	-	1	
5	Photo copy machine	1	1	3	1	1	
6	Barcode scanner	1	2	2	-	4	

7	RF Id	-	-	-	✓	-	
8	Display/ LCD projector	-	-	-	-	-	
9	CCTV	✓	✓	✓	-	-	
10	Other IT hardware (Please mention)	-	-	-	-	-	

Table-2 shows that adequate number of computers for library operations are available in all five libraries. For library operations there are four desk top computers in CEVDA, CETLY, CEGR and three computers in CETKR and CEPRN. College of Engineering Kidangoor stands ahead by providing the users with 20 computers for the facility of electronic resource access. CETLY and CETKR arranged 14 computers, CEVDA has six computers and CEPRN has five computers for the purpose of electronic resource access of the users. All college libraries except CEKGR have their own server. CEPRN library possesses one printer and other college libraries possess two printers each. CETLY library has got two document scanners and the rest of the libraries have got one document scanner each. CEVDA library possesses three photo copiers and the rest of the libraries possess one photo copier each. There are four barcode scanners in CEKGR, two each in CEVDA and CETLY and one in CETKR. RF-ID system is installed in CEPRN only. As RF-ID tag and scanner are part of the system there doesn't arise the need of barcode scanner in CEPRN library. CCTV has been installed in CETKR, CETLY and CEVDA and no library possesses LCD projector.

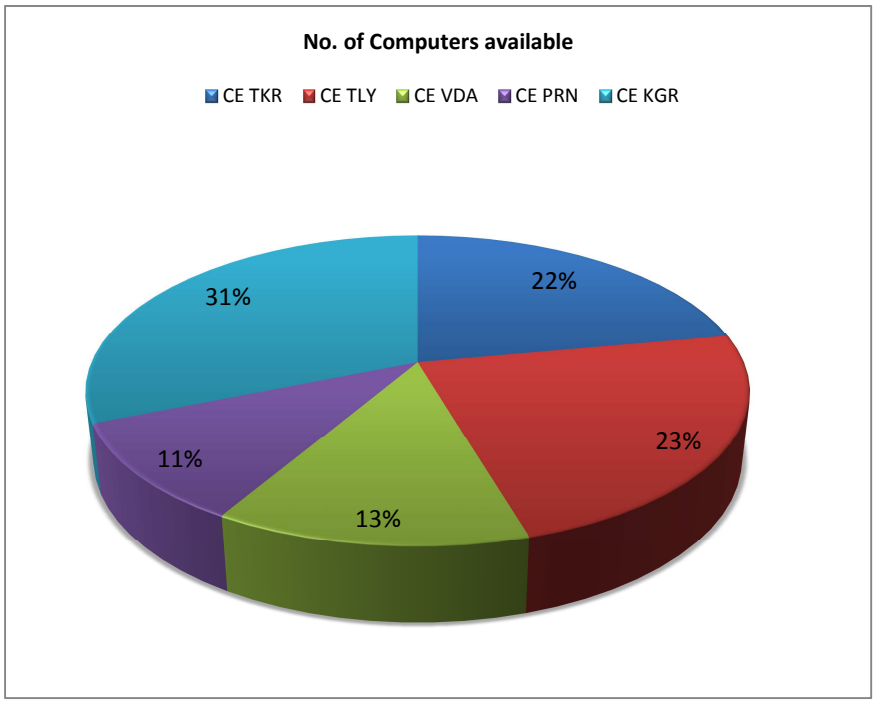
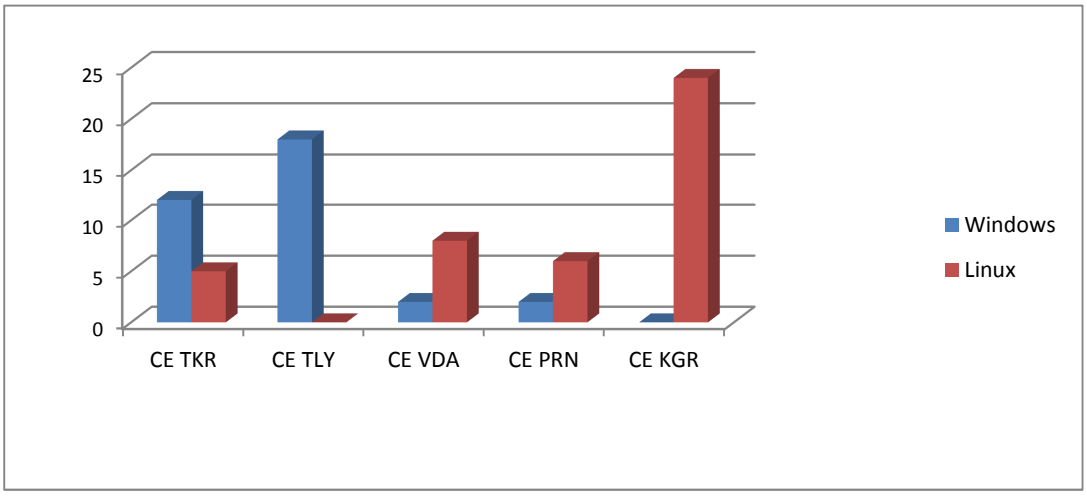


Table- 3.Software facilities

Sl. No.	ITEM	CE TKR	CE TLY	CE VDA	CE PRN	CE KGR	TOTAL
1	Operating system Windows	12	18	2	2	-	34
	Linux	5	-	8	6	24	43
	Other (Please mention)	-	-	-	-	-	
2	DBMS	✓	✓	✓	✓	✓	
	Please mention	Mysql	Mysql	Mysql	Mysql	Mysql	
3	Content development software	✓	✓	✓	✓	✓	
4	Security software	✓	✓	✓	✓	✓	
5	Library automation software	✓	✓	✓	✓	✓	
	Please mention	koha	Koha	Koha	Koha	Koha	
6	Digital Lib. Software	✓	-	-	✓	-	
	Please mention	dspace	-	-	Dspace	-	
7	Plagiarism detection software	-	-	-	-	-	
8	Reference management soft.	-	-	-	-	-	
9	Content management system						
	Joomla	-	✓	-	-	-	
	Wordpress	-	-	✓	-	-	
	Weebly	✓					
	Moodle cms	✓	-	✓	-	-	
	Other CMS (Please mention)	-	-	-	-	-	
10	Other software (Please mention)	-	-	-	-	-	



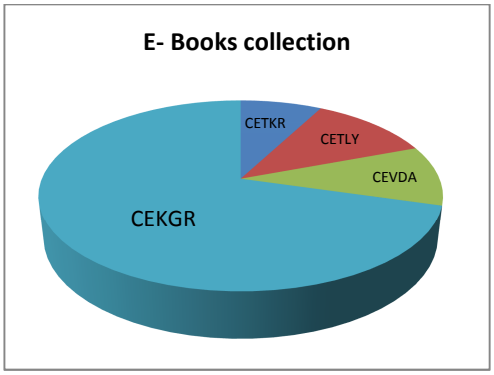
In the library of College of Engineering Trikkarippur Linux operating system is used in five desktop computers and Windows operating system in 12 desk top computers. In the library of College of Engineering Thalassery all the 18 systems run in Windows operating system while the library of College of Engineering Vadakara uses 8 systems in Linux and 2 systems in Windows, the library of College of Engineering Perumon uses 6 Linux and 2 Windows and the library of College of Engineering Kidangoor uses Linux operating system in all 24 systems.

Database management software, Content development softwares and security software are used in all CAPE College libraries. Library automation software also is used in all collages. The open source software Koha ILS is used for library automation in all colleges. The software for digital library management (DSpace) is installed in CETKR and CEPRN only. Plagiarism detection software and Reference management software are not used in CAPE College libraries. Moodle course management software is installed in CEVDA and CETKR libraries. Joomla is used in CETLY and Weebly in CETKR libraries, both of which are Content management systems. (Table- 3)

Table- 4 E- Books

Sl. No.	ITEM	CE TKR	CE TLY	CE VDA	CE PRN	CE KGR	TOTAL
1	Wiley	-	-	161	-	-	161
2	Pearson	-	111	258	-	-	369
3	Videeya	322	-	-	-	-	322
4	Elsevier	-	-	-	-	2920	2920
5	Informatics	-	-	-	-	-	
6	Open access books	-	367	-	-	-	367
7	Other e- books/ packages	-	-	-	-	-	
TOTAL		322	478	419		2920	4139

E- Book facilities are there in all colleges except CEPRN. The highest number of e- book collection is in CEKGR and the lowest number is in CETKR. In CETLY one package of Pearson publishers is set up, in CEVDA two packages are set up, one of Pearson publisher's and the other of Wiley publishers, in CEKGR one package of Elsivier is set up and in CETKR one package of selected titles purchased through Videeya is available. E-book collection is not there in CEPRN. Open access books collection is there only in CETLY.(Table-4.)



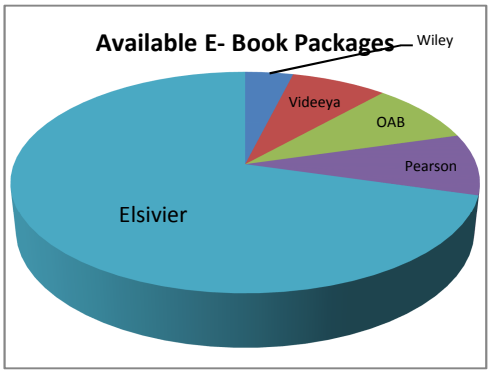


Table- 5.Online resources

Sl. No.	ITEM	CE TKR	CE TLY	CE VDA	CE PRN	CE KGR
1	**E- Journal** Elsevier – Science Direct	✓	✓	✓	✓	✓
2	IEEE	✓	✓	✓	✓	✓
3	ASME		✓	-	✓	-
4	ASCE	✓	✓	✓	-	✓
5	IEE	-	-	-	-	-
6	J-gate	-	-	✓	✓	✓
7	Open access Journals	✓	✓	✓	-	-
8	Other e- journal (Please mention)	-	-	-	-	-
9	**Online databases**	-	-	-	-	-
10	**Other online resources** (Please mention)	-	-	-	-	-

All colleges under CAPE subscribe online journals. Elsivier and IEEE packages are available in all colleges. Besides this ASME package is available in CETLY and CEPRN, ASCE package in CETKR, CETLY, CEVDA and CEKGR and J-GATE package in CEVDA, CEPRN and CEKGR. In addition to this open access journal article retrieval facility is available in CETLY and CEVDA libraries. (Table-5)

Table- 6.Library network / consortium /co-operation

Sl. No.	ITEM	CE TKR	CE TLY	CE VDA	CE PRN	CE KGR
1	National Digital library	✓	✓	✓	✓	✓
2	E- Shodhsindhu	✓	✓	✓	✓	✓
3	NPTEL	✓	✓	✓	✓	✓
4	National knowledge network	✓	✓	✓	✓	✓
5	Other national/state leve/ corporate level Consortium	-	-	-	-	-
	(Please mention)	-	-	-	-	-
6	Resource sharing (inter library)	-	-	-	-	-
7	Library co-operation	-	-	-	-	-

All colleges under CAPE have been registered in National Digital Library (NDL). They have also been registered in E- Shodhsindhu. NPTEL facility is there in all colleges. All colleges have been connected with National Knowledge Network (NKN). But there is no facility for library co-operation and resource sharing among the CAPE Colleges. (Table- 6)

Table- 7.Internet facility

Sl. No.	ITEM	CE TKR	CE TLY	CE VDA	CE PRN	CE KGR
1	**Service provider**					
	BSNL	-	✓	✓	✓	✓
	Railtel	✓	✓	-	✓	-
	Power grid	-	✓	-	-	-
	Other (please mention)	-	-	-	-	-
2	**Type of connection**					
	Dial-up	-	-	-	-	-
	DSL/ADSL	✓	✓	✓	✓	✓
	ISDN	-	-	-	-	-
	Other (please mention)	-	-	-	-	-
3	**Band width (mb/s)**1st	100 mb/s	100mb/s	100 mb/s	100mb/s	12mb/s
	2nd	-	10mb/s	8mb/s	10mb/s	10mb/s
4	**LAN**	✓	✓	✓	✓	✓
5	**WiFi**	✓	✓	✓	✓	✓

All colleges under CAPE are connected with internet by DSL/ADSL connection. All CAPE colleges have the local area network facility which is one of the important ICT infrastructures for electronic information transaction and retrieval. WiFi facility also is available in all colleges. All colleges except CEKGR have high speed internet connection of 100mb/s. there are two connections of 10mb/s and 12mb/s in CEKGR. Two connections each from different service providers are there in CETLY, CEVDA and CEPRN. High speed connection provided by RailTel is available in CETKR,CETLY and CEPRN and in CEVDA Power Grid Corporation provides high speed internet connection. CEKGR has the BSNL connection. There are additional BSNL connection in CETLY,CEVDA and CEPRN. Thus these colleges have ensured uninterrupted internet connection. Libraries are connected with campus LAN in all colleges. (Table-7)

Table- 8.WEB based services

Sl. No.	ITEM	CE TKR	CE TLY	CE VDA	CE PRN	CE KGR
1	Library web page	✓	-	✓	✓	✓
2	Social media page	-	-	✓	-	-
3	Library website	-	✓	-	-	-
4	Web OPAC	✓	✓	✓	✓	✓
5	Online renewal of book	-	✓	-	-	-
6	Online reservation / suggestion	-	✓	-	-	-
7	E mail/sms alert service	-	-	-	-	-
8	CAS	✓	✓	✓	✓	✓
9	SDI	-	-	-	-	-
10	Institutional repository	-	✓	-	-	-
11	Other web based services (please mention)	-	-	-	-	-

Web page is maintained in all college libraries under CAPE. There is a social media page for CEVDA library. Only CETLY College library owns a website. All libraries provide the Web OPAC and CAS. CETLY Library provides e-mail/sms alert service, online reservation and renewal service and repository service. No CAPE college library provides SDI service. (Table-8)

Findings

Majority of engineering colleges under CAPE possess moderate level of IT infrastructure facilities. CAPE College libraries are automated

by using the Open source software Koha Integrated Library Management System.

Online information access facilities are available in all CAPE college libraries. Majority of the colleges under CAPE have e- book collection. Web based services are provided in all CAPE college libraries. Majority of the colleges under CAPE lack digital library using special software.

Suggestions

Resource planning:- resource planning has to be conducted in all CAPE college libraries. The maximum level of library facilities can be achieved by ensuring the maximum usage and mutual relationship of ICT infrastructure and resources by identifying all the resources like hardware, software, learning resources, manpower etc.

Resource sharing:- resource sharing facilities can be setup in CAPE college libraries. If there is facility for sharing ICT infrastructure and electronic resources among CAPE colleges, they can acquire more e- resources and can reduce expenses by avoiding repetition of resource acquisition. Instead of purchasing Pearson's e-books package in College of Engineering Thalassery and College of Engineering Vadakara, CAPE could have purchase it only once and give allcolleges access to it. Then they could have avoided repetition of purchase and thus the expenses also. Thus resource sharing facilities have to be setup among college libraries in order to get access to e- resources for all colleges under CAPE.

Consortium:- a consortium of CAPE engineering colleges can be formed in order to avoid the repeated subscription of e- journals, databases and other costly online information sources in different colleges. Such a consortium will be very helpful for subscribing more packages of e-resources very economically.

Open source software:- there are enough basic infrastructure facilities for electronic information access like high speed internet connection, LAN, WiFi etc. in all colleges. But the softwares which easily organize and arrange e- resources to suit the right customer are not available in many of the colleges. This limitation can be solved easily by using open source applications without economic burden.

Conclusion

ICT infrastructure facilities and electronic resources are indispensable for Academic Libraries. As CAPE engineering Colleges contribute greatly to the engineering education of Kerala, it is very important for them to provide the best services by setting up the post modern technological infrastructure facilities in order to mould future engineers to meet the demand of the coming generation and thus for the development of the nation. The study shows that CAPE college libraries have paid much attention to the development of ICT infrastructure and facilities. Almost all libraries have the basic hardware facilities such as server, computer, printer, scanner etc. WiFi facility, LAN and high speed internet facilities for uninterrupted internet access also are possessed by all the colleges. But the lack

of software like Digital library management software has to be fixed up to locate the necessary electronic information easily by using the existing ICT infrastructure. The limited web based services which are being given presently, have to be made more comprehensive by utilizing the existing infrastructure. CAPE college libraries can be turned in to the best engineering college libraries if the authority gives proper attention and supervision in organizing all the available electronic resources and infrastructure to get maximum output, and also in procuring and operating essential softwares.

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