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ICT Usage in Higher Education Institutions of Punjab: A Content Analysis Approach

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Abstract

The current study evaluates the utilization of Information & Communication Technology (ICT) for information dissemination on the official website of public and private universities in the state of Punjab. The study compares public and private universities regarding the extent of information displayed on its official websites. In the present research the availability of the content was examined considering qualitative analysis i.e. analysing the content on the two variables namely, "Administration" and "Teaching & Learning". The instrument comprised 36 items across these variables, on which the association among the university type and the extent of information availability had been assessed with the use of test of association. The results reflected that both private and public universities display similar types of content on its official websites. Notably, most of the universities display the content on the items viz., "About University/History/About us", "University Information (Address, Email, Phone no, Toll Free no)", "Courses/Programs Information", "Notifications/ Announcements", "Admission Information", "Social Media Links (Facebook/Instagram/ Twitter)" and "Departments".

Keywords: ICT, public university, private university, university website, content analysis, higher education

Introduction

The systematic framework of information & communication technologies (ICT) has revolutionized information dissemination across diverse sectors, including banking, hospitality, healthcare, education, and beyond, enabling rapid access and exchange of information. UNESCO (2009) defines ICT as "a broad set of technological tools and resources used to transmit, store, create, share or exchange information." The digital tools and resources encompass hardware and software, networks and media for information, data processing and related services that helps in communication. ICT comprises of interactive digital content, online repositories, interactive forums, management information system, etc. (MHRD, 2012).

In education sector, the growing technological adaptation has contributed for the use of digital equipment's & devices that has helped educational institutions in knowledge dissemination which led to the transformation in tertiary education ecosystem. This development enhanced students' accessibility and affordability and brought prominent

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changes in the ways of teaching-learning methodologies and processes (Sife, Lwoga, & Sanga, 2007; Al-Rahmi et al., 2020). Majority of the educational institutions have encouraged in its teaching-learning activities (Yusuf, 2005; Noor-Ul-Amin, 2013; Ali et al, 2015) as it led to upliftment of teaching- learning (Gueldenzoph et al. 2000; Lowerison, Sclater, Schmid & Abrami, 2006; Adeoye, Oluwole, & Blessing, 2013, Khan & Markauskaite, 2018) for teachers as well as students (Achimugu, Oluwagbemi & Oluwaranti, 2010). Additionally, ICT contributes significantly for administrative activities of the HEI's (Maki, 2008; Alam, 2016; Qureshi & Qazi Abro, 2016). Specifically in universities ICT is being used for managing various types of data, office automation, report generation, (Bosu, 2019), maintenance of office records, admission process, project submission, monitoring and evaluation, and communication with stakeholders, computation and processing, planning, instructing & monitoring, and effective communication (Onyije and Opara, 2013; Pohekar, 2018).

By and large, increased use of internet has changed the way people look for the information at one click. In addition, compliance for the regularity requirements, the universities display lot of information in public domain on its official website. These phenomenon's have encouraged the universities to optimally utilize ICT through the institution's official website information accessibility that can be fetched by the connected stakeholders surpassing the time and geographical boundaries.

An institutional website reflects its ICT adoption and usage, as it showcases the universities' ability to leverage technology for communication, information dissemination and online services. Website of a university act as a primary source of information for various stakeholders like existing students, faculty and staff, parents & guardians, prospective students, researchers, academicians etc. (Sahney et al., 2004; Astani & Elhindi 2008; Mustafa & Al-Zoua'bi, 2008; Tate et al., 2009; Mentes & Turan, 2012; Permatasari et al., 2014; Bozyigit & Akkan, 2014; Van Deventer & Lues, 2023) and it functions as a comprehensive online hub, providing access to program information, online registration, fees details & fee processing information, course material & resources, examination & result details, library data bases, information on services & facilities, and important documents & forms (Iniesta-Bonillo et al. 2013; Saichaie & Morphew, 2014; Van Deventer & Lues, 2023).

In light of above stated discussion, it is significant to understand the activities for which ICT is being utilized by the HEI's through its official website. The study examined the current usage of ICT by public and private universities in the "state of Punjab".

Tertiary Institutions (Universities) in Punjab

Punjab is situated in the northern part of India and share border with Himachal Pradesh, Haryana, Jammu & Kashmir, Rajasthan and Chandigarh (Punjab.gov.in., 2023). As per the table 1, the structure of higher education institutions i.e. universities in the "state of Punjab" includes public universities, private universities and institutions of national importance. Public universities include Central university, state public universities, and public deemed university, whereas, private universities include state private universities and private deemed university. These universities offer various programs in the fields of engineering, science, social science, management, agriculture, law, pharmacy, medical science etc. (Sharma & Mehra, 2017).

Table 1. Number of Universities in Punjab.

Type	Number
Public University	16
Private University	19
Institution of National Importance	6
Total	41

Source: UGC, 2023

The current study is confined to the assessment and comparison of ICT usage by the public and private universities in the "state of Punjab".

Research Objectives

- To examine the ICT utilization for seeking information through the official website of public and private universities in the 'state of Punjab".
- To make a comparison between public and private universities with respect to the amount of information available on universities official website.

Methodology

The study followed the qualitative analytical technique adopting content analysis for identification of available content related to "Administration" and "Teaching & Learning" activities of the institution on the websites of the universities in the "state of Punjab" as it is presumed that a website of a university must contain the information about the university and its important activities.

A website content analysis is analysis of content available on the website, Burns & Berelson (1953) defines "content analysis as a research technique for the objective, systematic and quantitative description of the manifest content of communication." In the present study

content available on websites of public and private universities in the “state of Punjab” have been viewed to check the utilization of ICT for administrative and teaching & learning information.

According to table 2 there are 16 public universities and 19 private universities in the “state of Punjab”, however, for the current study, 19 private universities and 15 public universities considered for assessment. Website of the university mentioned at Sr. No. 16 in the table was not operational during the data collection phase. The official website of these universities has been examined to collect the data from various pages and available links on the two variables, namely, “Administration” and “Teaching & Learning”.

Table 2. List of universities in the “state of Punjab”

Sr. No.	Name of the University	Abbreviation	Year of Establishment	Official Website
		Public Universities		
1	“Punjabi University”	PUP	1961	www.punjabiuniversity.ac.in/
2	“Punjab Agriculture University”	PAU	1962	www.pau.edu/
3	“Guru Nanak Dev University”	GNDU	1969	online.gndu.ac.in/
4	“I.K. Gujaral Punjab Technical University”	PTU	1997	ptu.ac.in/
5	“Sant Longowal Institute of Engineering and Technology”	SLIET	1991	sliet.ac.in/
6	“Baba Farid University of Health Sciences”	BFUHS	1998	www.bfuhs.ac.in/
7	“Guru AngadDev Veterinary & Animal Sciences University”	GADVASU	2005	www.gadvasu.in/
8	“Rajiv Gandhi National University of Law”	RGNUL	2006	www.rgnul.ac.in/
9	“Central University of Punjab”	CUP	2009	cup.edu.in/
10	“Guru Ravidas Ayurved University”	GRAU	2011	graupunjab.org/
11	“Maharaja RanjitSingh Punjab Technical University”	MRSPTU	2015	www.mrsptu.ac.in/
12	“Jagat Guru Nanak Dev Punjab State Open University”	PSOU	2019	psou.ac.in/
13	“The Maharaja BhupinderSingh Punjab Sports University”	MBSPSU	2019	mbspsu.ac.in/en/
14	“Sardar BeantSingh State University”	SBSSU	2021	www.sbssugsp.ac.in/
15	“Shaheed Bhagat Singh University”	SBS	2021	sbssu.ac.in/
16	“*Sri Guru TegBahadur State University of Law”	SGTBSUL	2020	-
		Private University		
1	“Thapar Institute of Engineering and Technology (TIET)”	TIET	1956	www.thapar.edu/
2	“Lovely Professional University”	LPU	2005	www.lpu.in/
3	“Sri Guru Granth Sahib World University”	SGGSWU	2008	www.sggswu.edu.in/

4	"Chitkara University"	CHITKARA	2010	www.chitkara.edu.in/overview/
5	"Guru Kashi University"	GKU	2011	www.gku.ac.in/
6	"Adesh University"	AU	2012	adeshuniversity.ac.in/
7	"Chandigarh University"	CU	2012	www.cuchd.in/
8	"Desh Bhagat University"	DBU	2012	deshbhagatuniversity.in/
9	"DAV University"	DAVU	2013	www.davuniversity.org/
10	"GNA University"	GNA	2014	www.gnauniversity.edu.in/
11	"Rayat Bahra University"	RBU	2014	rayatbahrauniversity.edu.in/
12	"Akal University"	AKAL	2015	auts.ac.in/
13	"RIMT University"	RIMT	2015	rimt.ac.in/
14	"Sant BabaBhag Singh University"	SBBSU	2015	sbbsuniversity.ac.in/
15	"CT University"	CTU	2016	www.ctuniversity.in/
16	"Sri Guru RamDas University of Health Sciences"	SGRDUHS	2016	www.sgrduhs.in/
17	"Amity University"	AMITY	2021	amity.edu/mohali/
18	"Lamrin Tech Skills University"	LTSU	2021	www.ltsu.ac.in/
19	"Plaksha University"	PLASHKA	2021	plaksha.edu.in/

Source: UGC, 2023; * Website not Available

As per table 3, the instrument comprised of total 36 items for assessing the usage of ICT on the official website of the universities, of which twenty-seven items were kept under the variable variable "Administration" and nine statements were contemplated to assess the availability of data on the variable "Teaching & Learning". The dimensions kept under the variables had been derived from the studies of Gullikson et al. (1999), Mustafa & Al-Zoua'bi (2008), Padmannavar & Joshi (2011), Greenwood (2012), Bozyigit & Akkan (2014), Alexander & Ishak (2018), and, Papadimitriou (2018) and observation after carefully surfing the website of the universities.

Table 3. The keywords used for the data collection from the websites

S No.	Administration/ Teaching Learning	Variable
1	**Administration**	About University/History/About us
2		Vision
3		Mission
4		University Information (Address, Email, Phone no, Toll Free no
5		Map/ Navigation
6		Notifications/Announcement
7		Admission Information
8		Online Admission
9		Online Fee Portal
10		Placements

11		Jobs
12		Alumni Information/Link
13		Events/ University News
14		Facilities/ Amenities & Services
15		Accommodation/Hostel
16		Health Services
17		Virtual Tour
18		Quick Links
19		Search Feature
20		FAQs
21		About IT department
22		Student Login
23		Employee Login
24		Funds/Awards/ Scholarships and Policies
25		Internal Social Groups (Clubs Activities/ Student Unions)
26		Social Media Links (Facebook/Instagram/Twitter)
27		Telephone Directory
28		Academic Calendar
29		Departments
30		Courses/Programs Information
31	**Teaching & Learning**	Syllabi
32		Library Resources
33		Publications (University Journals/Books/ Publication by Faculty)
34		Examination Details
35		Examination Date sheet
36		Results

Source: Primary data

The test of association i.e. Chi-Square has been performed in SPSS, for comparing the level of content available on official website of public universities and private universities. It was used to examine the alliance between type of university and extent of availability of information. Type of university has been categorized as public university and private university. Extent of availability of information has been classified in two categories viz., limited availability of information (9-22 items) and extensive availability of information (23 & more items). For the above-mentioned object of the current study, the hypothesis was framed as follows:

H_0: There is no association between type of university and extent of availability of information on the university's official website.

H_1: There is association between type of university and extent of availability of information on the university's official website.

Analysis and Interpretation

Table 4 represents the data acquired from the official website of the public and private universities of Punjab. The table describes the list of variables demonstrating the information present on the webpage of the public and private universities out of total 36 variables with percentage including both administrative information as well as teaching- learning information.

Table 4. University-wise content display on university's official website

Sr. No.	Private University	No. of Variables	In %age	Public University	No. of Variables	In %age
1	TIET	33	91.67	PUP	27	75
2	LPU	34	94.44	PAU	20	55.56
3	SGGSWU	26	72.22	GNDU	29	80.56
4	CHITKARA	18	50.00	SLIET	27	75.00
5	GKU	26	72.22	PTU	29	80.56
6	CU	30	83.33	BFUHS	22	61.11
7	DBU	28	77.78	GADVASU	21	58.33
8	AU	24	66.67	RGNUL	25	69.44
9	DAVU	23	63.89	CUP	31	86.11
10	GNA	22	61.11	GRAU	9	25.00
11	RBU	22	61.11	MRSPTU	28	77.78
12	AKAL	19	52.78	PSOU	21	58.33
13	RIMT	25	69.44	MBSPSU	18	50.00
14	SBBSU	24	66.67	SBSSU	19	52.78
15	CTU	30	83.33	SBSSU	23	63.89
16	SGRDUHS	17	47.22			
17	AMITY	14	38.89			
18	LTSU	21	58.33			
19	PLAKSHA	19	52.78			

Source: Primary data

Table 4 illustrates that almost all the public and private universities have been displaying both administrative information and teaching & learning information on its university's official website. In case of the private universities listed at Sr.No. 1 & 2 i.e. LPU & TIET have been displaying most of the content i.e. 34 items (94.44%) & 33 items (91.67%) on its official website respectively, whereas, Amity University has been sharing least content i.e. 14 items (38.89%) on its official website. In case of public universities, Central University of Punjab (CUP) has been sharing most of the administrative and teaching & learning content on its website i.e. 31 items (86.11%) whereas, Guru Ravidas Ayurved University (GRAU) has been sharing least content i.e. 9 items (25 %) out of all the public universities operational in the state of Punjab.

Table 5 represents variable-wise display of content on both public and private universities. Data reflects that all the universities have been displaying information on three items i.e. “About University/History/About us”, “University Information (Address, Email, Phone no, Toll Free no)” and “Courses/Programs Information”. In addition, the information on four items have been displayed by significant number of universities (more than 90%) i.e. “Notifications/ Announcements”, “Admission Information”, “Social Media Links (Facebook/Instagram/Twitter)” and “Departments”. The least amount of information displayed on the official website of universities is related to “About IT Department”, “Search Feature”, and “Telephone Directory”.

Table 5. Variable-wise content display on university’s official website

Variables ↓	Sr. No.	Items on Variables	No. of Private Universities	No. of Public Universities	Total	In %
Administration	1	About University/History/About us	19	15	34	100.00
	2	Vision	18	11	29	85.29
	3	Mission	18	10	28	82.35
	4	University Information (Address, Email, Phone no, Toll Free no)	19	15	34	100.00
	5	Map/ Navigation	15	9	24	70.59
	6	Notifications/Announcement	17	14	31	91.18
	7	Admission Information	17	14	31	91.18
	8	Online Admission	18	11	29	85.29
	9	Online Fee Portal	10	10	20	58.82
	10	Placements	14	8	22	64.71
	11	Jobs	16	13	29	85.29
	12	Alumni Information/Link	14	9	23	67.65
	13	Events/ University News	17	13	30	88.24
	14	Facilities/ Amenities & Services	13	10	23	67.65
	15	Accommodation/Hostel	14	10	24	70.59
	16	Health Services	9	7	16	47.06
	17	Virtual Tour	8	2	10	29.41
	18	Quick Links	6	9	15	44.12
	19	Search Feature	6	2	8	23.53
	20	FAQs	5	5	10	29.41
	21	About IT department	2	4	6	17.65
	22	Student Login	11	10	21	61.76
	23	Employee Login	6	4	10	29.41
	24	Funds/Awards/ Scholarships and Policies	16	6	22	64.71
	25	Internal Social Groups (Clubs Activities/ Student Unions)	9	10	19	55.88

	26	Social Media Links (Facebook/Instagram/Twitter)	18	13	31	91.18
	27	Telephone Directory	0	2	2	5.88
	28	Academic Calendar	12	10	22	64.71
	29	Departments	19	14	33	97.06
	30	Courses/Programs Information	19	15	34	100.00
	31	Syllabi	12	10	22	64.71
Teaching & Learning	32	Library Resources	9	10	19	55.88
	33	Publications (University Journals/Books/ Publication by Faculty)	14	11	25	73.53
	34	Examination Details	13	10	23	67.65
	35	Examination Date sheet	11	13	24	70.59
	36	Results	11	11	22	64.71

Source: Primary data

The universities are further compared predicated on the extent of availability of information on the official website. The extent of availability of information has been categorised as "Limited Information" in which the display of information ranges between 9-22 dimensions and "Extensive Information" in which the display of information is on 23 or more dimensions. It is observed from table 6 that in case of private universities 11 (57.89%) out of 19 universities display extensive content on its website, whereas, only 8 (42.1%) out of 19 universities falls in the category of displaying limited content on its websites. Similarly, in case of public universities 8 (53.33%) out of 15 universities display extensive content on its websites whereas, 7 (46.66%) out of 15 display limited content.

Table 6. Chi-square test for the comparison of public and private universities

Private1Public2 * Slab Crosstabulation					
		Display of Information on Website			Significance Value
		9-22 (Limited Information)	23 & onwards (Extensive Information)	Total	
Type of University	Private	8 (42.1%)	11 (57.89%)	19	0.790*
	Public	7 (46.66%)	8 (53.33%)	15	
Total		15	19	34	

Source: Primary data; * 5% level of significance

Testing of Hypothesis

Table 6 reflects that the significance value of Chi-square is 0.790 which is more than 0.05, therefore, null hypothesis is accepted, meaning thereby the non-existence of difference in the extent of information made available by universities in the state of Punjab. Therefore, universities of Punjab under the study have been displaying same type of content on the institute's official website with regard to administration and teaching & learning information.

Discussion

The study under consideration examined the usage of ICT for the availability of information on the official websites of public and private universities related to "Administration" and "Teaching & Learning" in the "state of Punjab" using content analysis approach. A comparative report after making analysis of the content drawn from the official website of private and public universities revealed a uniformity in the way, information is displayed. The universities that have been in existence for at least 10-15 years and offer a wide range of multi-disciplinary programmes tend to display extensive information (23 & onwards items) on its official website. Further, the findings reported that most of the universities have been displaying the information on items viz., "About University/History/About us", "University Information (Address, Email, Phone no, Toll Free no)", "Courses/Programs Information", "Notifications/ Announcements", "Admission Information", "Social Media Links (Facebook/Instagram/Twitter)" and "Departments". A similar pattern of social media use by HEI's has been described by Greenwood (2012), Permatasari (2014) and Kusumawati (2018). Additionally, the results indicated that most of the university's official website display the content related to administrative and teaching & learning information on its websites (Jones & Meyer, 2012; Pohekar, 2018) with an exception of not displaying the information in the same manner (Menon & Moitra, 2014) or exhibiting insufficient information (Jones & Meyer, 2012; Jamil & Hussain, 2004).

Over the period of last ten years tertiary education witnessed a significant surge in ICT adoption, facilitated by the administration's proactive use of official website to disseminate information to stakeholders. It might be due to the compliance requirements with regulatory bodies that universities are forced to display both administrative and academic information on its website, ensuring transparency and accountability as a mandate by India's education regulatory bodies (AICTE, 2024; ICAR, 2017; NCTE, 2005). In addition to the regulatory requirements, the highly competitive nature of the tertiary education sector has encouraged the use of website; enabling institutions to differentiate them from other institutions and attract stakeholders (Štefko et al., 2015; Alexander & Ishak ,2018; Kusumawati, 2018; Al

Assaf & Al-Momani, 2020). Furthermore, official website has become an essential learning resource for students, offering them with a platform to access course materials, academic schedules, results & date sheet (Prayitno, et al., 2019) and faculty information, thereby, enhancing their overall learning experience. In todays' digital era, website of an institution serves as a primary public interface which is referred by the multiple stakeholders viz., faculty, existing & potentials students, parents, councils & regulatory and researchers & academicians' bodies to get the information, defying the constraint of time and geographical boundaries so it becomes imperative for the universities to focus on completeness, correctness and adequacy of information displayed on its official website.

Limitations

Website content is regularly updated by university officials and the analysis reflects the content available at a specific point of time and may not be same at all the time. The study is limited to the public and private universities in the state of Punjab only. The findings cannot be generalized to the universities established in the other Indian states or countries.

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