INFORMATION PROCESSING, DECISION MAKING AND CHOICE IN HIGHER EDUCATION: A STUDY OF SELECT INSTITUTIONS

Thesis submitted to the Jawaharlal Nehru University
in fulfilment of the requirements for the award of the degree of

DOCTOR OF PHILOSOPHY

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DECLARATION

I, Binay Kumar Pathak, do hereby declare that the thesis entitled "Information Processing, Decision Making and Choice in Higher Education: A Study of Select Institutions", submitted to the Jawaharlal Nehru University for the award of the degree of Doctor of Philosophy is my *bonafide* work and this thesis has not been previously submitted for the award of any degree of this university or any other university.

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CONTENTS

Chapter Seven: Summary and Conclusions

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ICT	Information and Communication Technology
HE	Higher Education
CSG	Civil Society Groups
NGOs	Non-Governmental Organisation
UNESCO	United Nations Educational, Scientific and Cultural Oraganisation
HEIs	Higher Education Institution
GER	Gross Enrollment Ratio
RUSA	Rastriya Uchchatar Siksha Abhiyan
IoE	Institution of Eminence
OECD	Oraganisation for Economic Co-operation and Development
MHRD	Ministry of Human Resource and Development
CABE	Central Advisory Board of Education
NEP	New Education Policy
AISHE	All India Survey of Higher Education
RTI Act	Right to Information Act
IIT	Indian Institute of Technology
UGC	University Grants Commission
AICTE	All India Council for Technical Education
MCI	Medical Council of India
PFMS	Public Finance Management System
EONR	European Organisation for Nuclear Research
WWW	World Wide Web
URL	Uniform Resource Locator

USA	United States of America
GDI	General Definition of Information
MTC	Mathematical Theory of Communication
CIA	Central Intelligence Agency
CD	Compact Disk
DVD	Digital Versatile Disk
PAN card	Permanent Account Number card
ISP	Information Seeking Process
IPR	Intellectual Property Right
TRIPS	Trade Related Aspects of Intellectual Property Rights
GPG	Global Public Good
LIS	Library and Information Science
UID	Unique Identification
EMC	Effective marginal cost
CD-ROM	Compact Disk Read Only Memory
WAI	Web Assessment Index
WIF	Web Impact Factor

Chapter 1

Introduction and Background

1.1 Background of the Study

Information has been an important part of our lives even before the Information and Communication Technology (ICT) endowed transformations took place. In our personal and social life, knowingly or unknowingly, we do gather and disseminate information. The dissemination and collection of information takes place through different processes and means of communication. With the development in the ICT, the means of communication have changed in importance and use, inducing changes in the interrelated processes. These changes in turn have transformed the scale and speed of information flow around us. This immense presence and flow of information appears before us in many quantitative (physical) and qualitative forms. While we indentify information as data or *byte* in physical or quantitative sense, the ontology of information as resource, rights, transparency, accountability and surveillance have entered into literature and public debate[1]. Information being the factor behind desires and reason drives choices and decision making. The importance of this driving factor increases with the significance of goal(s) of the choice(s) to be made. Higher Education (HE), being a life changing and life enabling goal, renders immense importance to information for making choices in HE.

In a country like India with 153 million people in the age-group of 18-23 years, understanding HE choices of students with respect to information processing attains crucial importance[2]. India, the third largest economy of the world has the second largest HE system in terms of size (Tilak & Mathew, 2015). The HE system in India consists of more than 800 universities or university level institutions and more than 39,000 colleges. Such a large HE system adds to the difficulties in choice and decision making. Thus, understanding HE choices and decision making can be contextualised with the help of developments in two areas-increasing presence and influence of information around us, and the developments in the HE sector in India.

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[1] Byte is unit of digital information. It consists of 8 bits and is the smallest addressable unit of memory of a device.

[2] 18-23 years is the relevant age group for HE.

The interaction of the two developments-information and HE also plays important roles. These contexts are discussed in the following sub-sections:-

1.1.1 Information: presence and influence

It has become a commonplace to find use of words like *smart, digital, electronic (e), online.* A range of goods and services, from home appliances to devices like television, phone etcetera, are preceded by these words as some sort of honorific. Not only our banking or shopping have become *online* even our urban planning models, nowadays, are called *smart cities.* The kind of advancement or uniqueness that the use of these words intends to denote is the facility to be connected to the Internet round the clock with the aid of computer and software applications. This connectedness to the Internet provides utility as a medium of communication to search, to share, to receive and to generate information through our engagements to or contributions on various platforms. The generation, sharing and receiving of information on the Internet have become so continuous and commonplace that words like *smart, digital, electronic (e), online* have become complements of names of a range of utilities and services and have quietly crept into our day-today vocabulary. The impact of such technological advancements is not limited to transformations in global economic structure (Spence, 2014) rather the emergence of the *Internet of Things* and artificial intelligence are here to influence almost all spheres of life. While these developments would be driving productivity to (almost) zero marginal cost (Rifkin, 2014), they bring with them hitherto unknown challenges of governance and management on one hand and on the other hand lead us to complexities of dealing with changing conceptions of information[3].

The overwhelming presence and impact of information on our lives is the outcome of a series of developments. Some of the milestones of these developments can be traced back to the advent of languages, the invention of printing press and the advances in the ICT. These advancements have transformed our lives so much that it is almost impossible to imagine a world without them. Our usual day features reading newspapers and periodicals, watching television, gazing at billboards and hoardings while travelling, receiving calls and messages of all kinds from texts to video files on our *smart-phones* from a host of commercial, political/semi-political or civil society

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[3] Appliances connected to the Internet can be controlled from any place. Thus, the effort to control an extra appliance will be negligible and reduction in employment will be seen.

groups (CSGs)[4]. The dissemination and collection of information in our personal and social life through different processes are guided by the use of mediums with varying speed and scale associated with them. With the Internet dominating the other forms of media and communication, the distinction between the real and the virtual world is gradually becoming blurred[5].

Information is valuable due to the meaning(s) it conveys. This qualitative feature of information gives rise to interrelated facets such as belief, knowledge and truth; and inherent processes such as communication, collection, dissemination and justification. Information in its various facets depends closely on these inherent processes. Information has always been crucial in human decision making and choice. A fear of uncertainty has driven human civilisations to various arts or sciences of prediction. The fear of uncertainty and the insurance market have close association as buyers tend to minimise probable losses and the buyers gain from lower probabilities of occurrence of uncertain events. The existence of such markets and predictions of various kinds have further increased the role and importance of information in choice and decision making. The role of information becomes more vital for areas of life with long term goals such as career and higher education. As our beliefs, opinion and choices are guided by the kind of information we gather and process, the sources of information and intentions of the providers matter a lot. The providers or mediators of information may indulge in '*pitching stories and communicating in sound bytes*' to mould the opinion or choices of the receivers (Stack, 2016). The phenomenon is known as mediatisation which seems to be affecting crucial dimensions of our life- such as economic and political (Hjarvard, 2008).

1.1.2 Information, Education and Society

Information is apparently the most important component and outcome of education, an integral part of socialisation. Education at all levels in general and HE in particular, contributes to the formation of human capital and genesis of knowledge, forms of information, to sustain life (Schultz, 1960). These forms of information equip us to face emerging challenges and attain progress. As the process of education taking

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[4] CSGs here subsume Non Government Organisations (NGOs) as well.
[5] Virtual world is generally used to denote the collective representation of information related to the real world on the Internet. The two worlds are becoming interdependent and interrelated day by day. Virtual presence of people is not limited to the use of social media (*facebook*, twitter etcetera) only rather with compulsion of linking biometric identity (such as Unique identification or Aadhar in India) with services, virtual world is growing beyond imagination.

place inside the classroom is an activity taking place on behalf of the society (Patnaik, 2007), information in its various facets, generated and processed in the education sector, has wider implications. Educational institutions advertise for admission of students, recruitment of teachers and staff, and issuing of tenders (mostly government funded or sponsored institutions). These institutions also take part in campaigns, although occasionally, to generate awareness on social issues, to popularise government policies (mission mode projects such as *Swachcha Bharat Abhiyan*) and agenda of parent organisations. Educational institutions which are funded by government or are in receipt of any sort of contribution from governments at various levels also come under the purview of the Right to Information. E-Governance in educational institutions can be found in the use of online portals for admission, fee payments, and other related services. Educational institutions at different levels utilise websites for information dissemination and aiding to their reputation building. They are also required to furnish some key information like fee-structure, faculty details, and infrastructure on their websites under various regulations, as discussed in the next section. Apart from imparting education and furnishing mandated information, agricultural universities in India engage in extension activities with farmers. There are campaigns and advocacy networks led by the UNESCO to promote community engagement and social responsibility in HE[6]. Thus, the interconnectedness of education and society appears vividly manifested in HE which lends itself as a suitable sector to understand various facets of information which guides our choices and decision making depending upon the nature and availability of information and the way it is processed.

1.1.3 HE sector in India

Indian HE is said to be characterised with universal trends of massification, privatisation and competition[7]. While the focus on privatisation and competition are visible, massification or expansion appears to have lost the prioritisation it used to

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[6] UNESCO World Conference on Higher Education held on 8th of July, 2009 suggested social responsibility for HEIs and called upon their mutual engagement to serve the purpose of HE as a public good.
[7] Two reports published by the OECD in 2008 and 2009 observed that Indian HE sector manifests universal trends such as competition (among institutions and students both), privatisation (changing modes of financing) and massification observable throughout the world albeit with different degrees.

receive[8]. The loss of orientation towards expansion is revealed by the stagnancy of GER (Gross Enrolment Ratio) in HE at 25.3 in 2014-15 and 25.4 in 2015-16[9]. More than half of the enrolment is said to be in private HEIs, mostly in the professional courses. In a country with 153 million people in the age group of 18-23, stagnant GER signals limited access to HE and might increase competition among students seeking entry into the system.

With the limited access to HE, there are attempts to commoditise Education in general and HE in particular. Publicly funded HEIs are being pushed to earn resources in the name of autonomy and promises of hikes in salary after the recommendation of the Seventh Pay Commission (Mohanty, 2017)[10]. Own resource generation is also one of the key elements under the Rashtriya Uchchatar Siksha Abhiyan (RUSA) and the proposal to set up Institutions of Eminence (IoE) for self-sustaining the programmes initiated by government funding. There have also been efforts to create more space for private providers of HE and allow profiteering in HE (Bhushan, 2013)[11]. Though private participation in HE emerged in the colonial period itself, the recent surge in private participation in HE finds resonance with policy prescriptions since the adoption of the new economic policy in the 1990s, which gave birth to the dominance of economic reforms in policy making. Such changes in the approach towards the nature of HE are reflected in the recent directives (mentioned above) from the MHRD. To meet the cut in expenditure or insufficient allocation of funds, HEIs are being encouraged to reduce their cost of operation and augment resources at their own[12]. Universities are struggling hard to manage their day-to-day expenditure. HEIs run by state governments suffer more as compared to their Central counterparts due to

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[8] Expansion of HE, one of the three goals of HE policy, appeared to be pursued actively while the other two -equity and excellence seemed to receive little attention as compared to the levels achieved by the first goal (Pathak, 2014).

[9] GER is the percentage of students of age group 18-23 enrolled in HE with respect to the total population of people in the 18-23 age group. The data on GER is from the Ministry of Human Resource Development (MHRD), Government of India.

[10] Mohanty B.K. (2017): "Government varsity rule raises fear of fee hike", available from https://www.telegraphindia.com/1170131/jsp/nation/story_133247.jsp retrieved last on 03.08.2017.

[11] The recommendations for the expansion of higher education sector by allowing for-profit educational institutions were made for the first time by the High Level Group on Service Sector' of the erstwhile Planning Commission, Government of India (2008). Private universities and colleges also receive financial assistance in the form of land at concessional rates. Private HEIs can avail research grants for projects from government agencies.

[12] The first formal imprint of policy suggesting own resource generation by HEIs is the Central Advisory Board on Education (CABE) Report on Gnanam Committee Report of 1992. Punnaya Committee (1992-93) recommended incentives for the universities generating their own resources and penalty for universities failing to reduce their cost of operation.

poor financial health of the respective state governments. In such a situation, the expansion of HE would be unsustainable if the sector does not receive financial support oriented towards balanced growth of the sector (Dholakia *et al*, 2016)[13].

The decline in public expenditure on HE and emergence of private providers of HE leads to the issue of affordability emanating from the rising fee-structure in HE. It is argued that private providers have been emerging to fill the gap between the rising demand for HE and limited supply by the public sector. The spectre of private provisioning of HE, which implies the application of market principles in the operation and management of HE, has engulfed the HE system as more than half of enrolment is in the private HEIs. Cost of access to HE is on rise in India, since the adoption of the NEP, on two counts- (1) hikes in fees by publicly funded HEIs to meet targets of own resource generation and (2) relatively higher fees charged by private HEIs, which account for more than half of the enrolment in HE, to cover cost of providing HE, with or without profit(s). This has implications in two folds- (i) implications for profiteering by private HEIs and partial privatisation by publicly funded HEIs; and (ii) implying dearness of HE and raising equity concerns. Thus, the first implication points to the supply side whereas the other to the demand side.

On the demand side, affordability prerequisites purchasing power at disposal and capability to compete in line with hierarchical placement of HEIs among themselves. Here, access to information becomes important for the students to be able to evaluate the alternatives and to decide among the alternatives based on the purchasing power in hand and their credential backgrounds. Accessing information itself entails cost and demands capability to comprehend institutional information systems. Thus, affordability in terms of purchasing power and capability attains more importance in view of unravelling the underpinnings from the demand side (Sen, 1999). The process develops through the aggregation of individual choice orderings, the millions of decisions to trade-off one desire, goal or need for one another. These trade-offs alter the form and composition of the information base leading to changes in the provision of rules and maximising opportunities, the direction of learning and trails, the discourse and logic. Information processing by prospective students does

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[13] Dholakia, R., V. S. Chand & R. Sharma (2016): "Financing Higher Education" available from http://www.livemint.com/Opinion/QIp9NXppiiraKsGPJU02wN/Financing-higher-education.html retrieved last on 04.08.2017

not only depend on their capabilities and efforts but also on mechanisms or systems in place for information from HEIs to be made available for students.

The prospective students to be able to make efficient choices need to gather information relating to HEIs. This helps them to realise their choices in the light of their paying capacity, capability and other socio-economic conditions and qualifications. HEIs in their attempt to attract students provide information through newspapers, prospectus, brochures and websites. The sources of information that are used during external search by the prospective students can be classified into: market controlled (advertisements, brochures, websites of sellers), independent sources (newspapers, magazines), interpersonal sources (friends, acquaintances) and direct inspection. Among these sources, advertisements in newspapers have limited scope for information processing. Brochures and prospectus are available before the admission process only. Websites of HEIs can provide information to whoever visits the website at any point of time. Nowadays, with the growing popularity of Internet, websites of the HEIs have become dynamic sources of information. Their dynamism includes expectation of them to be up to date (with information updates) and being continuously available. The websites of HEIs act as effective sources of information for all within and outside institutions and as signalling devices for the institutions. The information furnished by the websites of HEIs to the students signal the quality of education through academic infrastructure and quality of the faculty, the nature and degree of strength of governance structure, the quality of the peer group and other related attributes of the institutions such as transparency and governance.

1.1.4 Information and regulation in HE

While transparency and accountability have become the buzz words in public affairs, Indian HE has witnessed specific policies aimed at ensuring transparency in the sector. The accreditation of HEIs (degree awarding institutions) and colleges have been made mandatory from 2013 with a view to ensure minimum quality standards. The MHRD has started releasing data collected from HEIs through All India Survey on Higher Education (AISHE) since 2010-11 to bring out information reported by the HEIs themselves. The MHRD also launched the National Institutional Ranking Framework in 2015 to rank institutions across the country based on data reported by the institutions. Apart from these initiatives, there are specific regulations to make

HEIs furnish information to students or public in general. These policies or regulations can be traced through the following-

1. **Right to Information (RTI) Act, 2005:** The RTI Act 2005 provides citizens the right to access information under the control of "public authorities". This Act mandates all "public authorities"- public organisations and departments to furnish information to general public as and when demanded from them. The organisations and departments are required to mention on their websites the names and addresses of contact persons (information officers) and appellate authorities in this respect.

    Section 2 (h) of the Act defines "public authorities" under four categories. Out of these four, three categories are relevant for HEIs. Central Universities and Institutions of National Importance (IITs) which are established by Acts passed by the Parliament are "public authorities" as per Section 2 (h) (b) of the RTI Act. Similarly, State Universities established through Acts passed by State Legislatures fall under categories of "public authorities' according to Section 2 (h) (c) of the RTI Act. Other HEIs which are funded either by Central or State governments come under the purview of this Act and are categorised as "public authorities" under Section 2 (h) (d) (i). A good number of private HEIs have shown tendencies to escape the ambit of The RTI Act.[14] However, the Central Information Commission has categorically ruled that all private HEIs come under the purview of the RTI Act.[15] The debates over the inclusion of private HEIs under the ambit of the RTI Act will be discussed in Chapter-6 in detail.

    1.1 Proactive (suo motu) disclosure: The RTI Act 2005 prescribes proactive disclosure of information by public authorities to reduce the filing of RTI applications by individuals and ensuring proper functioning of organisations/departments {Section 4(1) (b) of the RTI Act, 2005}. Information to be disclosed include details of organisation/department,

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[14]Joshi Prasad (2013): "Private deemed universities ignore RTI Act, flout UGC and MHRD norms on public disclosure", The Indian Express, September 30, 2013

[15] Central Information Commission (2009): Decision No CIC /OK/A/2008/01098/SG/2550, available from http://www.rti.india.gov.in/cic_decisions/SG3103200913.pdf

Central Information Commission (2010): Decision No. CIC/SG/C/2009/000629/4091Adjucnt-I , available from www.rti.india.gov.in/cic.../CIC_WB_A_2010_000831_T_53528.pdf

functionaries, financial information-grants received and utilised, details of responses to RTI applications etcetera. Information to be disclosed proactively needs to be disseminated through proper means and methods including the Internet {Section 4(2) & (3) of the RTI Act, 2005}.

2. **Mandatory Disclosure by Technical/Professional HEIs:**
   The RTI Act 2005 mandates proactive disclosure of information. However, a debate over inclusion of private HEIs under the ambit of the RTI started to surface since the enactment of the Act. The MHRD through the apex regulating bodies overseeing professional education such as the All India Council for Technical Education (AICTE) for technical education and the Medical Council of India (MCI) for medical education mandated the institutions offering professional education to furnish information related to fee-structure, infrastructure, faculty, placements, functionaries of the institutions, affiliation etcetera relevant for choice making by students on their websites. The apex bodies have made the mandatory disclosure one of the important criterions to continue approval for course(s) since 2010.

3. **Rashtriya Uchchatar Siksha Abhiyan (RUSA):** This is a scheme introduced in 2013 by the Central Government and seeks to reform State Higher Education sector through inducing performance based expenditure in HE. Under this scheme funds are transferred to State Higher Education Councils which allocates the fund among state universities and colleges. This plan intends to facilitate state universities and colleges through project wise funding. This scheme mandates the HEIs in receipt of grants to maintain the updates of developments planned and executed with the funds granted under this scheme on their websites. The HEIs in receipt of grants have to report the details of expenditure and utilisation of funds received on the Public Financial Management System (PFMS), an online portal to account for funds granted through various schemes and projects by the Central Government.

4. **Digital India:** This is the successor of *the National E-Governance Plan* which aimed at promoting E-Governance in four stages. In the first stage, the information was to be brought online. In the second stage, documents were to

9

be made downloadable. The next stage targeted the facilitation of submission of documents through electronic communication systems and the last, that is, the fourth stage intended to provide complete online services through electronic portals. The plan also covered HE including other services. The *Digital India* launched in 2014, is an umbrella programme covering many departments and includes existing schemes such as *the National E-Governance Plan* added with some new schemes. Apart from improving digital infrastructure, the programme aims at providing services and governance according to demand. The programme also envisages bringing all universities on National Knowledge Network and providing Wi-Fi in all universities. This is an umbrella programme which is reflected in the regulations and schemes described above as well.

The schemes or regulations described above seek to ensure furnishing of information by the HEIs and intend to impose some sort of compulsion on HEIs in this regard. While furnishing information through various media is prescribed, Internet seems to be stressed upon. This realisation might have emerged from the fact that India is home to 460 million Internet users and ranks second in the world, next only to China[16]. While there is recognition of Internet as an important medium, the primary objective seems to be ensuring the flow of information from HEIs to students. These regulations become more crucial due to the lack of any proper legal arrangement to prohibit unfair practices in HE[17].

The sub-sections above present the contextual and policy relevant background of the study. The metamorphosis undergoing in the HE in India, one of the large systems in the world, necessitates studying the system from the choice and decision making perspective. The information needs of the students to make efficient choices in an age characterised with overwhelming presence of information requires careful understanding and investigation. The research problem emanating out from these backgrounds is stated below.

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[16]"Internet users in India: Statistics and Facts, available from https://www.statista.com/topics/2157/internet-usage-in-india/ last retrieved on 16.01.2018
[17] The *Prohibition of Unfair Practices in Technical Educational Institutions, Medical Educational Institutions and Universities Bill, 2010* lapsed in the Parliament. The Bill was aimed at prohibiting unfair practices such as charging capitation fees, furnishing misleading information etcetera.

Statement of the Problem

The HE system is rapidly progressing towards **marketisation** and HEIs, like firms, are **advertising or signalling** the quality of their products (courses or programme) through different media-the Internet becoming important among them. Third party sources (such as **Ranking agencies** and Regulating bodies) conveying information related to HEIs are also available. In an environment characterised with **increasing awareness** through ICT enabled sources, the HE market with its own peculiarities (related to the nature of the service, market and **irreversibility of choice**) presents itself as a site to understand decision making by students. In a world with overwhelming presence of information, websites of HEIs act as their virtual representation. As the HEIs, characterised with certain background and contexts, compete in a hierarchical market; their websites are expected to present the strategies according to the objectives of the HEIs. While the websites act as source of information for prospective students, they serve the purpose of advertising or signalling for the HEIs. The prospective students process such signals and their choices depend on information processed out of them. This study tries to look into the information processing with a focus on Internet, that is, websites of the HEIs. The virtual representation of HEIs requires holistic understanding to unravel the strategies and motives of the HEIs through availability of contents, their ordering and presentation. The study also seeks to understand information processing by students with respect to their backgrounds and experiences of information search. The triangulation of the two studies would help in understanding choice, decision making and information processing in HE.

1.2 The Study

With the above depicted research problem, the study is introduced in the following three sub-sections.

1.2.1 Purpose of the Study

The research work has undertaken two studies-(i) study of websites of HEIs and (ii) online survey of current students of HEIs. They seek to understand the information processing in Higher Education (HE) and the impact of information processing on choices and decision-making in the HE sector. Education in general and HE in particular, is an experience good, the market for which is prone to be suffering from

information asymmetry[18]. The expectations of students undergo change as they realise the true quality of education imparted to them at later stages.

Information has been recognised as an instrument of better governance and essential for efficient choice-making. The collection of information entails cost on the part of the information-seeker. The smoother the processing of information, the lesser is the cost associated with collection of information. The processing of information differs among higher education institutions (HEIs) as the process itself gets institutionalised. The websites of HEIs, their virtual representation, are sources of such institutionalised information architecture. Studying the websites of HEIs provides exposure to entire higher education sector on one hand and helps in understanding the way the HEIs compete and manifestation of their strategies in the hierarchical market.

The research work has undertaken study of adherence to regulations related to furnishing of information by the HEIs and perceptions of availability of information among students. The findings related to these aspects might be useful for the policymakers to bring about changes, if necessary, and to address the implementation issues, if any.

1.2.2 Research Questions

The two studies mentioned above seek to answer the following research questions-

Information processing and Source (Websites of HEIs)

1. What does HEI's virtual face (websites) say about HE in general? What is the extent of similarity (homogenisation) and dissimilarity in terms of availability of contents (arrangement/order) on websites of HEIs?

2. Is there any interrelationship among these arrangements of contents? If yes, what are the forms of segmentation of contents?

3. How do HEIs in India project the processes and output(s) as reflected by the content/ features of their websites)?

Contexts and Background of HEIs

4. What are the differences, if any, in information processing by different kinds of HEIs such as Central, State and Private HEIs?

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[18] These features of HE as a good and the market for HE are discussed in Chapter-3.

5. How do institutional contexts and characteristics such as HEI's location, status-affiliating or unitary, deemed; and courses and degrees offered influence information processing?

6. What is the extent of adherence to regulations by HEIs in terms of information processing through their websites?

7. What are the differences, if any, in adherence to regulations by different kinds of HEIs such as Central, State and Private HEIs?

Choice and Decision making by students

8. How do students collect and process information to pursue HE?

9. What are the roles played by institutional characteristics in information processing by students?

10. What are the factors affecting information processing by students?

11. What is the extent of correspondence between the information provided by the HEIs and that of desired by the students?

1.2.3 Significance of the Study

The research work would be helpful in addressing the lack of research on choice and decision making with respect to a certain source of information, the websites of HEIs. It has undertaken holistic study of the websites of HEIs with respect to their funding backgrounds and motives so guided. The empirical investigation carried out in the two studies seeks to gauge parameters related to information processing such as availability of information through websites. The study takes into account the existing regulations while analysing the websites of the HEIs. The research work draws theoretical premises from the areas of choice and decision-making and seeks to study the impact of information processing in general and through websites of HEIs in particular on student choices and decision-making vis- a-vis strategies and objectives of institutions in the higher education sector. The search and use of information and the extent of such searches and uses can be situated as the subject of maximising to '*satisficing*' behaviours of economic agents[19]. The extent of satisfaction can be sensed from experiences of students in their present HEIs with respect to their efforts of information seeking before admission and the processes involved including their

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[19] The genesis of procedural rationality as against the traditional idea of substantial rationality is discussed in next sections of this chapter and in Chapter-2.

background. Thus, it would add economic perspectives to the literature on websites of HEIs, mostly by scholars from Library and Information Science, Engineering, Psychology and Education background. The online survey of students intends to understand perceptions and experiences of students related to information processing, cost of collecting information and choice decisions.

1.3 Theoretical Overview:

The research work, to understand choice and decision making with respect to information processing, makes an attempt to relate and reconcile them. The attempt is presented in the following Figure-1.1. Choice and decision making usually starts with searching for information related to alternatives. While searching for information is also the first step of information processing which also includes assembling, prioritising and analysing information; it leads the information seeker (consumer) to sources of information. The sources of information act as interface between the buyers (information seekers) and sellers (information providers). This research work focuses on the Internet as the interface or source of information. Information forms important component for rationality as information enables reasoning. It is also linked to uncertainty through information processing. This is how information governs choice and decision making. These theoretical underpinnings are discussed in detail in the following sub-sections.

Figure-1.1: Theoretical Overview

Source: conceptualised by the researcher
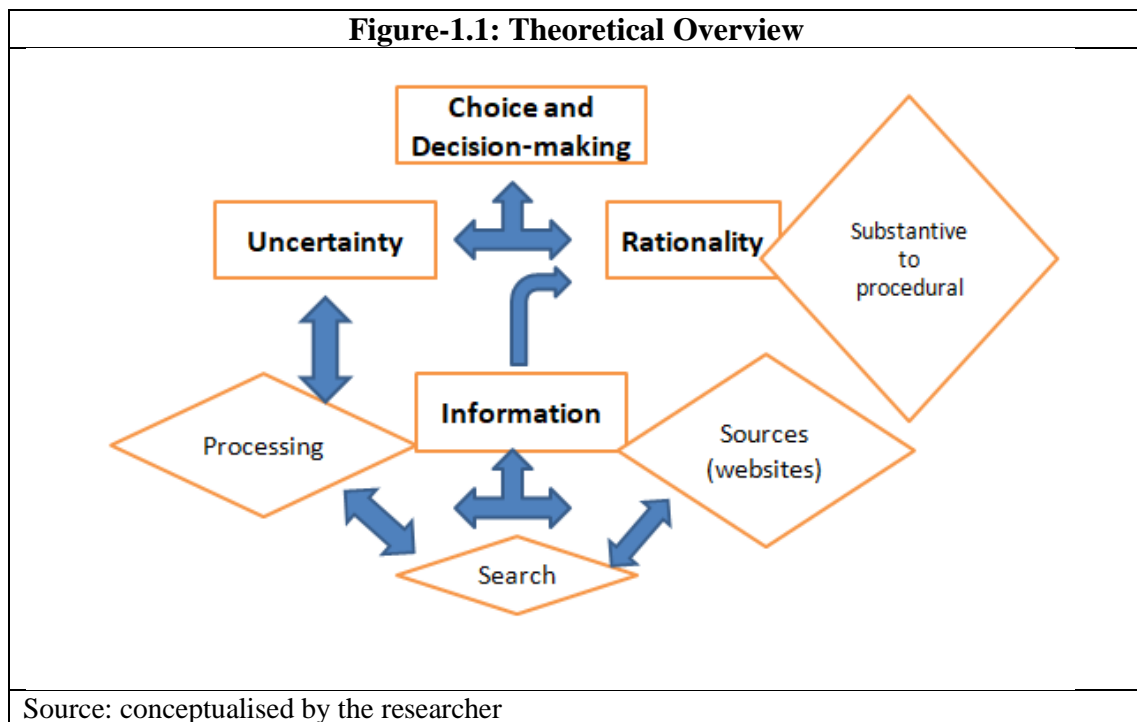
1.3.1 Information Processing

Information processing emerged as a cognitive approach to decision making which brought forward the importance of cognitive architecture of the human mind (Workman *et al*, 2009). The utilisation of the approach has not been limited to cognitive science or psychology rather has found relevance in the study of decision making at individual and organisational levels by the scholars of various disciplines such as political science, management, and economics. The relevance of the approach stems from the dimension it adds to understanding of rationality due to environmental or external constraints with respect to the cognitive capabilities. As for illustration, information processing approach considers implications of limitations on attention crucial for decision making. Attention of an individual or organisation is influenced by oversupply or undersupply of information. In the event of undersupply of information, individual or organisation requires searching and in the event of oversupply, prioritisation of information becomes necessary (*ibid*, 2009). Thus, the information processing approach can be utilised to understand information architecture available with an individual or an organisation given the understanding of cognitive architecture of an individual or information processing mechanism of an organisation. Here, an individual or organisation is assumed to be the processor of information given the cognitive capabilities of individual(s).

The concept of information processing, thus, refers to the processes of collection, assembling, interpretation and prioritisation of information or ordering of information. The Britannica Online Encyclopaedia uses acquisition, recording and retrieval of information to explain assembling of information; organisation and display of information for prioritisation and ordering of information respectively, and adds dissemination of information as one of the components of information processing[20].

1.3.2. Decision Making and Information:

Decision making is a broad term that applies to the process of making a choice from available alternatives for a given purpose. These alternatives might be fully known, that is, certain or known to some extent or unknown. We make decisions-small and big, from choosing our beverage or dress for a particular occasion to choosing a life-

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[20]Encyclopedia Britannica available from   https://www.britannica.com/topic/information-processing, retrieved last on 25.07.2017

partner or career path. Different decisions impact our lives differently as the impact of some of them is short-lived while some change the course of our lives. Our constraints and alternatives available to us also differ for different kinds of choices we need to make. But each decision can be characterised with the following elements-

    i)   A purpose to be fulfilled

    ii)   Listing out or ranking alternatives

    iii)   Choosing from the alternatives

Bettman *et al* (1991) gauges the difficulty of choice decisions on the basis of following elements-

    i)   With the increase in number of alternatives and attributes (characteristics to be used to rank alternatives)

    ii)   Difficulty of processing associated with (some) attributes

    iii)   Uncertainty associated with attributes

    iv)   With the decrease in number of shared attributes

One who is to make decisions is expected to have all relevant information regarding the purpose, the alternatives available, the probabilities associated with alternatives, and the pros and cons of the alternatives. Decision making, thus, can be understood in terms of two distinct but interrelated constituents-choices and information. The interrelations between choice and information can well be understood through understanding rationality and preferences (signals rationality through ordering and revelations). The developments in understanding of these interrelationships will be discussed in detail in the next chapter. Here, these concepts are presented to introduce their basic tenants so as to explain the theoretical overview with respect to the statement of the problem.

Choices and Rationality

Aristotle considered that choice involves desire and reasoning and these two are related to each other (Fahey, 2002)[21]. Hume also gave importance to both of them but considered passions (that drives desire) to be the prime mover (Nuyen, 1984).

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[21] Aristotle, Nicomachean Ethics, 1024 (1139a32), as mentioned in Fahey (2002)

Allingham (2002) summarises this interrelationship as "while desire without reasoning is infertile, reasoning itself is guided by desire". He suggests to trace reasonableness of patterns of choice in four contexts with respect to given menu (a list of items or alternatives available for choice)-

i) Certainty- a situation where all items listed in the menu are definite

ii) Uncertainty- a situation where items listed in the menu involve chance

iii) Strategy- a situation involving uncertainty where choices by two parties are interdependent

iv) Group choice- a situation where a number of people have to choose collectively such as elections

The reasonableness of choice can thus be linked to the availability of information related to list of items constituting the menu or alternatives available for choice, definiteness or chance associated with the items or alternatives and payoffs or outcome of the alternatives. The information related to these elements drives both the guiding factors of choice-desire and reasoning.

Economic theory has traditionally focussed more on reasoning and has assumed economic agents to be rational in the sense that they optimise their objectives. The optimisation process itself consists of availability of perfect information on the part of all agents and ordering of preferences. Desires appear to be subsumed under preferences of agents which are assumed to be exogenous, consistent and transitive. Thus, reason drives desires in economic theory. Rationality is characterised with reasoning along with ordering of preferences. The rational behaviour at the levels of households and firms lead to rationality at the market level. Thus, there appear three pillars of concept of rationality in traditional economic theory-(i) availability of perfect information, (ii) ordering of preferences which are exogenous, consistent and transitive, and (iii) optimisation such as maximisation of objective functions (utility for consumers and profit for firms) and minimisation of costs.

Classical Economists assumed an ergodic world where an outcome associated with any future date can be reliably predicted by analysing existing set of information. As a rational individual is assumed to possess all relevant information, the processing of this information attains crucial importance. Information processing as a

phenomenon may be direct or indirect through society and institutions. The phenomenon is also characterised with complexity and limited ability of the individuals to gather and process information (Simon; 1978, 1986). This differentiates *substantive rationality* of neoclassical economics from *procedural* or *bounded rationality* introduced by Simon. Here, the limits to rationality emerge out of skills, values and knowledge (information) of the individual(s). The substantive rationality of consumers considers choice as an optimum purchase under constraints and assumes

1. Consistency of choices
2. Vector dominance (more is better)
3. Self-interest driven individuals.

Choices and Preferences:

A rational consumer, in neoclassical economics, always selects the most preferred alternative from the feasible set. While this assumption restricts choice and preferences to diverge, preferences are assumed to be consistent, exogenous and transitive. Sen (2002) also emphasised that the concept of rationality must accommodate the diversity of reasons that may motivate choice. The traditional methods of mapping information to choice and considering preferences and values as exogenous have now appeared as limitations to understand the choice and decision making. This limited view of rationality has to be broadened with ideas from other disciplines so as to be able to understand self-interest of an individual along with his/her social consciousness (Majumdar, 1980). There are growing realisations within the discipline of economics that choices are not always exogenous rather they can be endogenous as well (Becker, 1962; Hogan, 1997).

Preferences differ as goals related to the exchange or use differs. Reih and Holligoss (2008) classify user goals into four levels- (a) long-term goals: a personal goal over a long time, e.g. academic; (b) leading goals: a current information task related goal, e.g. preparing for an examination; (c) current goals: specific search results sought, e.g. looking for papers and (d) interactive intentions: sub goals to be achieved during the seeking process, e.g. reading and evaluating papers. Goals such as academic choices might involve careful information processing due to the value attached to the goal and the opportunity cost involved. Moreover, education which is

an experience good requires information to be gathered to minimise possible loss, if any after admission.

Preferences are assumed to be independent of prices and exogenous but exercise of choice is related to ability to pay. Preferences are formed depending upon where the individual is located in and the time-period. Thus, the preferences get endogenised. Consumers' preferences are endogenous and are embodied in social arrangements of affairs (Hogan, 1997). Kahneman (2011) finds two systems of brain- fast and instinctive System I, and slow and explicitly calculative System II. System I is modified by the experiences of System II (pp-103-104). Thus, preferences are guided by beliefs and opinion created over time and formed on the basis of experiences and the kind of information one gathers and processes either from specific sources or larger socio-cultural context. Thus, content and context of preferences, both are important for choice and decision making. This, in a way, takes us back to the interrelationship between desire and reasoning propounded by Aristotle.

1.3.3 Information Search:

While discussing the importance of information for rationality of behavioural agents and the endogenous nature of preferences, it is also essential to understand the significance of information search; a crucial part of information processing. The information search process may be internal or external. Internal information search refers to information stored in memory whereas external information search involves information seeking from different sources. Thus, internal information search is closely linked to socialisation while external information search links society, societal processes and institutions with respect to choice making by individual(s). Information search by the individual(s) is important for understanding rationality on one hand and public policy decisions on the other. Public policy makers can improve the quality and accessibility of information on understanding how individuals use and collect information. Beatty & Smith (1987) define external information search as "the degree of attention, perception and efforts directed towards obtaining environmental data or information related to the specific purchase (goal of decision making) under consideration. However, Schmidt & Spreng (1996) believe that apart from external search some information is acquired continuously and may not be specifically related

to imminent choice under consideration. Such information search is known as ongoing search.

The sources of information that are used during external search can be classified into: market controlled (advertisements, brochures, search engines websites of sellers), independent sources (newspapers, magazines), interpersonal sources (friends, acquaintances, relatives) and direct inspection[22]. These sources vary not only in terms of accessibility but also the way information gets availed from them. Information search, the initiation part of information processing, is closely linked to the sources of information. Each step related to the phenomenon of information processing which starts from information search is crucial to understand the concept of rationality. Though there are cognitive and computational constraints imposed by nature along with economic constraints- time and cost; information search presents key to understand various stages of information processing an individual goes through before choice making.

Buying and selling of a commodity implies not just an exchange of commodities but also an exchange of information- about relevant characteristics of product or services (Birchler & Butler, 2007). To participate in exchange of goods and services in the market, both the consumers and the buyers need to be informed regarding the changes in the market situation. The sources of information of such changes may be formal or informal. One side of the market (sellers) may convey information to the other side through some formal sources like bulletin, brochure, URLs (Uniform Resource Locators) on the web etcetera; or through informal sources like actions in the market place. The other side of the market might access and utilise the sources based on their socio-economic conditions and ongoing trends. In the present information age, Internet has become one of the most utilised sources of information.

Internet as Source of Information

The roots of Internet can be traced back to 1969 to University of California, Los Angeles where scientists attempted to exchange data between two bulky computers.[23] This marks the development of Internet network concepts and first Network Control

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[22] Search engines such as Google might not be independent. There are reports claiming search engines being biased. Source: The Business Insider, 2 October 2014

[23] Collins J. (2013): Looking for the first web page, The Sunday Express, June 16, 2013, pp-17.

Protocol.[24] In 1990, Tim Berners-Lee, a scientist at European Organisation for Nuclear Research (CERN[25]), combined Internet with another concept hypertext[26] to innovate the first web page[27] of the world. Later the Internet found its life as a US military communications system with a purpose to provide a wholly secure means by which secret information could be circulated, a kind of internal electronic postal system (Graham, 1999). Gradually, it came into public domain and is getting popular day by day. So, what we use as Internet is physically networked system of computers, using a non-proprietary protocol for information transfer (Peterson & Merino, 2003). This technical phenomenon manifests as various popular applications, most popular of them being 'email' and World Wide Web (www) or simply the Web. While email is an electronic postal system www is a way of processing and presenting digital information. The Web uses hypertext which facilitates the contents both of the Web as a whole and of individual Web pages to be structured in a non-sequential or non-hierarchical way but enables texts, opinions and ideas to be linked to one another (Kuiper *et al*, 2005). It enables the user to follow his/her own path or to follow the provided links. If the user is not clear with objective, following the given links may lead to oblivion. "The web has been described as the 'killer application' for the Internet: the application that took the Internet from a relative handful of enthusiasts into the domain of serious, commercial and governmental users"(Barrett, 1996). This 'killer application' presents sound, video, animation, images and allows interactivity. The www or simply the web is being used as information processing media catering to whoever visits the web or is intended to be visiting the web. The most remarkable feature of www is its being dynamic, constantly changing and reorganising (Stowers, 1999) through its data getting overwritten and looped around regularly unlike a book which exists through time.

This transforming feature of the Internet equips it to bridge the gap between recurrent needs and the power of choice which can be connected through the notable feature of it. The www is a power to the people with a vengeance unlike the rather passive media as its interactive character presents ordinary citizens with the possibility of exercising an unprecedented influence on the social and political events

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[24] Stowers (1999)
[25] French acronym for European Organisation for Nuclear Research
[26] "Hypertext is a network of links between words, ideas and sources, one that has neither a centre nor an end" (Snyder, 1998, p. 127) as quoted in Kuiper *et al*, 2005.
[27] The first web page created by Tim Berners-Lee is available at http://info.cern.ch/

that determine their circumstances and prospects (Graham, 1999). Perhaps with this understanding the governments at all levels are becoming cyber-active and embracing E-governance.

While sources like the Internet facilitate and influence information search, it also depends on the goals of the exchange that the consumer is interested in. One of the most important goals in life is pursuing higher education (HE) as it is closely linked with career and livelihood. A prospective student has to indulge in information search related to higher education institutions (HEIs) keeping in mind his/her own background and alternatives available. The process of information search depends on a wide range of sources of information starting from family, society at large and the Internet The Internet might lead a prospective student to websites of HEIs, social media presence of HEIs, third party sources including public and private agencies and various other such web-pages comprising blogs, news portals etcetera. In such circumstances, websites of HEIs appear to be primary sources of information for students. While there are regulatory guidelines mandating HEIs to furnish information through their websites in India, virtual presence of HEIs in a global phenomenon. The virtual presence through websites is not only meant to attract students or prospective faculty but also to create brand image of universities to enhance rankings (Stack, 2016, p-20). An image of a delegation from India visiting an Australian University (presented in Appendix-1) illustrates how universities give importance to their websites. The background of the image portrays a wall with part of an advertisement board mentioning just the URL of the website of the university. This background explains the focus of this study on websites of HEIs as sources of information.

1.4 Scheme of Chapterisation

The Study consists of seven chapters including the present one. A brief introduction of the chapters is presented below-

Chapter-1: Introduction and Background

This present chapter introduces the background of the study, contextualises the study with respect to present regulations and policies and the main themes-information, choice and decision making, HE sector and role of Internet. The chapter draws the statement of the problem from the description of above themes and contexts. A

description of the theoretical overview for the study and the scheme of chapterisation are .also presented in the present, the first chapter.

Chapter-2: Theoretical understanding of Information, Decision making and Choice

This chapter presents literature survey to understand theoretical nuances related to Information, Decision making and Choice. It starts with presenting interrelationships between uncertainty and information. It also presents survey of literature related to understanding of information in economics and role of information in choice and decision making. The concept of rationality is critically reviewed and choice heuristics in situations of imperfections in information are discussed. The chapter presents a critical survey of literature in economics of information and tends to locate research gaps with respect to choices in HE.

Chapter-3: Choice and Decision making in Higher Education

This chapter presents survey of literature related to student choices in HE to understand the process and factors related to choice and decision making in higher education. The chapter seeks to understand the role of information in student choice with respect to information processing.

Chapter-4: The Study: Methodology and Design

The fourth chapter describes the formulation of research in view of addressing the gaps identified in literature, derivation of research methods and sample description. The chapter describes the two studies undertaken-survey of websites of HEIs and online questionnaire survey of students.

Chapter-5: Information Processing and HEIs

This fifth chapter analyses the data collected by the survey of websites of HEIs. The analysis tries to bring out the information processing by HEIs through their websites and traces the emerging differences. Interrelationships among contents available on websites and adherence to regulations by the HEIs will also be analysed.

Chapter-6: Information Processing and Choice by Students

This sixth chapter analyses the data collected by the online questionnaire survey. The analysis focuses on bringing out information search process carried out by students with respect to their socio-economic background and choice and decision-making consequent to information processing. Changes in perceptions of students after their admission is captured to understand the experience good character of HE and the existence of information asymmetry.

Chapter-7:

The last chapter presents the summary of the chapters and findings. The chapter would also draw conclusion from the summaries.

1.5 Summary

The chapter brings forth the differences in understanding of information in physical form with respect to information with meaning in terms of their importance in choice making. The interrelationship between reason and passion in forming choice is delineated to understand the role of rationality and preferences. This understanding provides background for discussion on rationality and behavioural economics in the next chapter. The role of Internet as source of information and influencing information processing due to its unique features is discussed. In the light of growing influence of ICT and expansionary policies of HE, regulatory framework attempting to ensure efficient and equitable choice making are described.

Chapter 2

Information, Decision making and Choice: Reviewing the Concepts and Theories

2.1 Introduction

The first chapter depicted the background of the study and attempted to locate the need for understanding choice and decision making in higher education, and the phenomenon of information processing. The theoretical understanding of information, choice and decision making along with concepts related to them would help to elaborate on the framework and arrive at gaps to formulate the agenda of research. This chapter seeks to serve this purpose. The chapter is divided in four sections. The first section presents a discussion on ontology of information. The second section deals with the interrelationship between information and various forms of uncertainty, and depicts various manifestations of information. The third section presents a survey of conceptualisation of information in economics, its value, characteristics and information asymmetry with its facets. The fourth section presents a survey of literature on role of information in choice and decision making. The fifth and the last section of the chapter summarises the literature survey and tries to locate gaps in literature.

2.2 Manifestations of Information

As discussed in the first chapter, we recognise different manifestations of information as data, belief and knowledge; which are related to each other in some way or other. Understanding their interrelationships and distinctions both become necessary before proceeding to look into the relationships between information, and choice and decision making. People can be observed having beliefs regarding different events and aspects of life. Beliefs might contain information but neither fully nor always. Bananno (2000) has modelled information as possibilities consistent with signals received from the environment. In this modelling, beliefs are based on information but not only on information rather they also include some amount of arbitrariness like intuition, hunch, guess etcetera. Losee (2014) defines beliefs as a set of informative characteristics treated as a unit that is accepted very likely as true or correct by an individual or a group of individuals, where individual(s) is/are part of belief

producing process. Thus, beliefs which are one of the most common manifestations of information do contain information but are not solely based on them. There is a considerable human agency involved in generation and propagation of beliefs both as input and channel of transmission.

Data: Information is also recognised by data, used frequently in the sense of storage (memory of electronic devices) and meaning (data mining, information management etcetera). The interrelationship between data and information, and their differences as well can be understood with the help of the following tripartite or triadic definition of information. This definition, propounded by Floridi (2010), is called the general definition of information (GDI). According to the GDI, € is an instance of information, understood as semantic content, if and only if;

    i.   € consists n data, for n≥1;

    ii.   The data are well formed;

    iii.   The data are meaningful.

So, data is supposed to have at least some content which are well formed. When data with well formed content conveys meaning, it becomes information. Eisgruber (1978) distinguishes information from data in the sense that data is transformed into information through the intervening acts of interpretation and analysis. Thus, all information is data but all data may not be information. Also, data has syntactical dimension while information has semantic dimension. Thus, data and information may be the same for transmission but they might differ according to their possibility of interpretation.

Knowledge: This manifestation of information encompasses its possessors with the capacity for intellectual or physical action, making it fundamentally a matter of cognitive capacity (Foray, 2006). This cognitive capacity does not refer only to one's individual capability rather might be a product of one's social and cultural setting (Mannheim, 1949)[28]. Dasgupta (2007) suggests that the word knowledge should not be used to refer only to 'the products of science and technology but should also include innovations in arts, music and literature'. Romer (1994) broadens the connotation of knowledge to include ideas, mathematical formula or even a concept. While knowledge might refer to a broad category of cognitive and intellectual actions, it should posses three essential features-justification, truthfulness and belief (Losee,

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[28] As quoted by Sjoberg & Nett (1992), p-10

2014). As mentioned above, beliefs might contain arbitrariness along with information; knowledge should be generated through reasoning and based exclusively on available information (Bananno, 2000).

Information, as mentioned above, takes the shape of structured and formatted data that remain passive and inert until they are used by those with the knowledge needed to interpret and process them (Foray, 2006). Truthfulness, timeliness, fineness and relevance are also desired properties of semantic information (Floridi, 2010; ibid, 2007). It thus appears that ''all knowledge is information but all information is not knowledge''.

2.3 Ontology of information

As discussed above, the importance of information emanates from its meaningfulness. This meaningfulness of information, known as semantic nature of information, along with the inherent processes draws interests of the social scientists while (natural) scientists, traditionally, have taken more interest in the syntactical dimension of information. Semantic information has three essential constituents- (i) sender(s), (ii) receiver(s) and (iii) medium/media. While these three constituents can also be observed in ICT enabled communication, the meanings conveyed to the receiver by or from the sender through the medium (or media) attain ontological significance. The distinction between the semantic and syntactical dimensions of information is important to understand the ontological significance of information. Bar-Hillel & Carnap (1953) developed the theory of semantic information to distinguish it from the Mathematical Theory of Communication (MTC) propounded by Shannon and Weaver. The discussion presented below would be helpful to understand the semantic dimension of information distinguishing it from the syntactical dimension.

Information in physical form

In colloquial sense, we recognise information as data, volume of publications, brochures, information bulletins, prospectus, newspapers, messages in various forms stored in our devices and similar other physical manifestations. The advancements in the ICT and rapid increase in the use of ICT enabled devices have contributed to the general recognition of information in these physical forms. This notion of information might have come from the use of the word 'information' with advancements in communication technology and collectively known as ICT. This general

understanding of information in physical form can also be traced to the Mathematical Theories of Communication (MTC) developed after the pioneering works of Shannon, known as *Information Theory*. These approaches to communication seek to optimise the efficiency of the channels of communication with the principle that an event with lesser probability of occurrence bears more information. Here, the focus is on structuring and ordering of information to reduce redundancy and noise to optimise the efficiency of the channels of communication. These approaches thus suggest existence of some limit on communication and storage of information, which might sound close to the concepts of information overload and bounded rationality. But these approaches limit themselves to the syntactical dimension of information. While Vedral (2010), a physicist, cites instances of (experiences of mathematician Thorpe in casinos) applicability of Shannon's entropy in minimising risks in portfolio market; Floridi (2010), a philosopher, finds *Information Theory* a misnomer for the MTC. There are growing realisations even among scientists as well that information derives its usefulness from the meanings or the messages conveyed. There are certain areas of life where the impact of information is quite immense such as *Internet of Things* mentioned in the first chapter, automation of industries leading to digital displacement of labour (Spence,2014), and artificial intelligence looming over the existing service industries as threat (Musk, 2017). These instances indicate the indispensability of understanding information in its totality. Luhn (2011) presents a survey covering attempts in the field of physics to reconcile the syntactic and semantic dimensions of information and advocates a triadic definition of information, which includes the three constituents of semantic information-the sender, the receiver and the transmission medium in the triad.

Information with Meaning:

Information with meaning acts as a resource for individuals and society. While it empowers individuals to make better choices, it plays crucial role in socialisation and making people aware of their roles in society (Foray, 2006)[29]. Information in its semantic dimension provides different meanings in different contexts. We experience information in this form in our day to day interactions with others. The meanings

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[29] Foray (2006) mentions that Karl Marx considered communication to be very important in making people aware of their roles in economy or society. In this sense, information which is the element communicated through media actually plays the role.

conveyed through information depend on the actors involved and the contexts. Words, actions, signals, organisation of these expressions and the media of their communication are very important for interpretation of meaning. We experience these semantically important differences in our day to day life when we communicate with our friends, family, and colleague etcetera in face to face communication, over phone or on social media.

Information which is an enabling factor for efficient choice making also acts as an empowering tool for the masses in a healthy democracy. There have been movements by civil society groups for transparency and accountability through information and to establish access to information as a right, which forms the basis for policies of E-Governance and mandatory disclosures. Transparency and accountability, the two pillars of governance are fundamentally based on information. Information is also important for privacy for individuals and secrecy or confidentiality for organisations and governments through restricting access to certain information. Thus, disclosure and restricting the free flow of information both attain importance for semantic dimension of information.

To understand the semantic dimension of information, we can enlist the following ways, as shown in Table-2.1, in which we perceive the pervasive existence of information around us in various forms. The Table-2.1 below presents select forms of semantic information with the three elements-sender(s), receiver(s) and medium/media. Literature (both written and oral) available in different forms ranging from books to collection of poems, songs etcetera have been part of human life in almost all civilisations. Their relevance in the digital age is manifested from their adaptation to digital forms. The Table also presents examples of advertisements we come across usually with varying purposes from commercial to matrimonial. Campaigns by political organisations and CSGs provide other important forms of semantic information playing role in moulding opinion of the masses. While these two forms represent semantic information with a motive on the part of the sender; information as the right, in the case of the Right to Information, and service delivery to the citizens such as through E-Governance show information serving the purposes of the citizens-the receiver. The Internet as media plays important roles in almost all forms of information flow but its role attains indispensability in the case of E-Governance. The recognition of information as right in policy discourse is coupled with the Right to Privacy declared as one of the fundamental rights under the

Universal Declaration of Human Rights[30]. While the citizens are empowered with the Right to Information to ensure transparency and accountability, they deserve to be protected from surveillance by the State in the name of checking leakages in service delivery[31]. The Right to Privacy can check surveillance occurring in a formal set up whereas the same has been continuing in many informal and hidden ways[32]. Thus, information which has the ability to empower masses as a right can also lead to vulnerability of citizens as a device for surveillance and moulding of opinions through campaigns, news and social media[33].

Table-2.1: Semantic Information: illustrative forms				
Forms	Sender	Receiver (intended)	Media	Purpose
Literature (in various forms)	Authors/Publishers/ Organisations/Singers/Composers/Producers	Readers/Listeners/Viewers	Print-books, pamphlets, audio-radio, CD/DVDs, video-CD/DVDs, films, Internet-websites, E-books	Propagation of knowledge, ideology, art, music etcetera
Advertisements	Producers/ Sellers/ Service Providers	Potential buyers	print-periodicals, hoardings; audio- radio, video-television, cinema screens etcetera; Internet-own website, promotional websites, online buying portals	influencing choice of potential buyers
	Organisations - Government and private	Potential candidates	print-periodicals, letters to related organisations; Internet-own website and promotional websites	attracting applications from potential jobseekers
	Organisations-mostly government	Potential sellers/ service providers	print-periodicals, Internet-own website and promotional websites	transparency in governance
	Prospective Bride/Groom	Prospective partner	print-periodicals, Internet-promotional websites	matrimonial choice
Campaigns	Political organisations	public in general, donors	print-periodicals, hoardings; audio- radio, video-television, cinema screen etcetera, Internet-own website and promotional websites	Agenda-setting, seeking vote during elections, moulding public opinion
	Civil Society Groups	public in general	print-periodicals, hoardings; audio- radio, video-television etcetera, Internet-own website and promotional websites	Agenda-setting, moulding public opinion
Right to	Governments at all	public in	print-application and letter(s) in	Information as a

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[30] Article 12 of the Universal Declaration of Human Rights (1948) mentions the right to privacy as one of the fundamental rights. http://www.un.org/en/universal-declaration-human-rights/
[31] The Public Interest Litigation against the indiscriminate use of Unique Identification (popularly known as Aadhar) is being heard by the Constitution Bench of the Supreme Court of India.
[32] Bayly (1996) in his book *Empire and Information* has presented the historical account of intelligence gathering and control of social communication by the rulers of different parts of India from 1780 to 1870. This takes place at present times as well through intelligence agencies.
[33] The Central Intelligence Agency (CIA) of the USA admitted last year before the US Senate that it has been giving fabricated stories to media houses since 1975. This admission establishes the essence of Bayly's work in present times as well.

Informati on	levels and related organisations/bodie s	general	reply, Internet-websites of related agencies for suo-moto information, email to apply	right of the citizens
E-Governa nce	Governments at all levels and related organisations/bodie s	public in general	print-citizens' charter, Internet-websites related to concerned agencies, portals, kiosks	Transparency in Governance, Service delivery
Identity/ Privacy	public in general	Organisatio ns - Governmen t and private	print- documents and certificates viz PAN Card, AADHAR etc, audio/video-recordings and tapping, Internet-Biometric details of citizens	Surveillance, checking leakage in service delivery
News	Broadcasting agencies, Media houses	public in general	print-periodicals, audio-radio, video-television, Internet-websites of the agencies, promotional websites, social media	Communication, Agenda setting, moulding public opinion
Social Media	Individuals, CSGs, Organisations-Government, private, Government and related agencies, Broadcasting agencies, Press	Individuals, CSGs, Organisatio ns-Governmen t, private, Governmen t and related agencies, Broadcasti ng agencies, Press	Internet-*Facebook, Twitter, Linkedin* and other such social media platforms	Connecting with friends and acquaintances, Advertisements, Campaigns, News,

Source: Compilation by the researcher

We often see posts, tweets or news in favour or against some particular policy or scheme. We also generate such information when we share our views on social media (*facebook, twitter* etcetera) or share the views expressed by others. Our growing engagements with the virtual world and almost continuous presence on social media have added a new dimension to marketing and advertisements[34]. The content of the status messages (on facebook, whatsapp and other applications/social media), tweets (on twitter), views or messages not only impact individuals and organisations but (has the potential to) generate public debate or mould public opinion, depending upon the background and contexts of the sender and the receiver[35]. The validity and truthfulness or lack of these attributes related to the communication taking place on social media give rise to hitherto unravelled forms of information processing in the

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[34] Marketing research agencies like Earnest and Young have been studying trends of Social Media Marketing for some years and report a growing influence.

[35] Benjamin G. Edelman, a Harvard Professor, critically studies Internet and brings out malicious practices on Internet by companies. His revelations through blogs have been found to impact the share prices of concerned companies. Source: The Economic Times, 15 February 2014

society. The phenomenon of mediatisation, mentioned in the first chapter, refers to these forms of semantic information. Frequent occurrences of fake news not only remind the days of yellow journalism but are severely penetrating due to rapid communication possible through the Internet[36]. The occurrences of fake news are not only the problems associated with the sources of information or the providers rather they weaken the trust of the receivers on news in general (Dardeli, 2017). Thus, semantic information is characterised with attributes like truthfulness, accuracy, symmetry etcetera.

Use of information in its various facets such as literacy, dance, music and other forms of arts has distinguished civilisations from each other. These facets of information and their use have also led to the development and management of different information systems by the rulers (Bayly, 1996; p-4). These information systems refer to the intelligence gathering and mechanism to control social communications employed by the rulers. Bayly (1996) refers to the totality of use of information in the form of education, arts, surveillance and communication as information order. The changing information order with the aid of ICT can be observed in the form of mediatisation in economic, social and political spheres in all major countries of the world. To understand the spectre of mediatisation let us take the example of political campaigns which have been totally transformed. These campaigns are not only limited to winning elections these days rather they go on to influence mass opinion to mould public image of the government, the leader(s) and their policies. While campaigns and anti-campaigns have been usual features of democracy around the world, the present era is characterised with continuous, voluminous and rapid mass campaigning utilising all available means and media. The recent phenomenon of *post-truth* campaigning wherein less or non-verified information in the forms of advertisements, tweets, posts and comments are propagated have appeared as challenges to the understanding of choice and decision making in particular and societal information processing and choices in general[37]. The growing instances of fake-news and the emergence of the *post-truth* society have made our world more uncertain even in the Information age.

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[36] Yellow journalism refers to fake news published in newspapers in the US during the 30s to favour a certain political opinion or group.

[37] Tweets refer to opinion shared on the social media platform Twitter. The tweets can be of maximum 140 characters which include letters, numbers and spaces in between them. Posts refer to opinion shared on the *facebook*, another social media platform.

2.4 Uncertainty and Information

Human civilisations have engaged themselves in grappling with their environments, the universe, mysteries of life and numerous such questions since their beginning. In these efforts to unravel the reality, human beings have been experiencing manifestations of " *known knowns, known unknowns and unknown unknowns*" in the universe (Vedral, 2010). These manifestations themselves point out to three situations of awareness (or ignorance) with three facets of information. While these manifestations cover all the spheres of life, they have specific implications for choice and decision making. In the first situation, choice involves a menu whose items are definite and known, a choice situation involving certainty. In the second situation, the items are definite but not (fully) known, a situation involving chance or probability associated with items of the menu. In the third situation, the items are neither definite (the list might be indefinite) nor known (the probabilities associated with items which are listed are not known). The second and third situations refer to choices under uncertainty. Thus, uncertainty appears to arise with respect to lack of information, either related to the list of alternatives or the probabilities associated with the items/alternatives or both of them. Here, the understanding of *knowns* and *unknowns* is important to distinguish the semantic dimension of information from the syntactic one.

2.4.1 Uncertainty and its forms

The above description hints an inverse relationship between information and uncertainty, that is, information reduces uncertainty. The credit for deriving mathematical association between information and uncertainty goes to Shannon (1948). Shannon & Weaver (1949) utilised the concepts of probability to define information and to find associations between informational and thermodynamic entropy. In their formulation, the total number of possible cases generated by the source of information is called uncertainty. For example, the total number of events generated due to rolling of a dice is six, the extent of uncertainty. They define information in relation to the number of favourable cases related to an event, that is, the probability of an event. The lesser the probability of an event, the more is the generation of information which reduces the uncertainty. Again for example, rolling of a dice generates more information as compared to tossing of a coin as probability

associated with each roll of dice (1/6) is lesser than each toss of a coin (1/2). In these examples, information seems to fill up the data-deficit perceived by the receiver. Floridi (2010) finds the use of the term uncertainty for the total number of possible cases (the data-deficit perceived by the receiver) inappropriate. Uncertainty is just the situation of data- deficit or lack of information as suggested by Shannon & Weaver (1949). The use of uncertainty for such situations existed in literature even before Shannon, as Heisenberg also used the same term to denote lack of information of a quantity by an observer, or to experimental inaccuracies with which a quantity is measured[38]. Unlike the notion of uncertainty and its association with information in natural sciences, social sciences differ in conceptualisation of the terms. When supply (availability) of information fills data-deficit or simply lack of information, it reduces the imperfection in availability of information and leads the receiver towards perfection. Different forms of availability of information are designated as asymmetric information, imperfect information, incomplete information, complete information and perfect information in economics literature. These different stages are discussed later in this chapter.

Another idea of uncertainty prevailed in philosophy starting with Socrates, Plato to Kant. This idea suggested that "the more we gain insights into the mysteries of nature, the more we become aware of limits of our knowledge about *things as such are*" (Tannert *et al*, 2007). This notion of uncertainty raises question on information as a measure of uncertainty and as a means of reducing uncertainty. This also indicates some kind of limitation on utilisation of information on one hand and some sort of cognitive situation with increasing information. Knight (1921) in his book *Risk, Uncertainty, and Profit* distinguished between risk and uncertainty. He characterised risk as measurable and uncertainty as immeasurable, where measurability refers to the extent of information utilised to ascertain alternatives, consequences and estimation of probabilities in terms of frequencies or propensities. Research in the area of information processing by the cognitive scientists such as Miller (1956), Atkinson & Shriffin (1968) and others seem to reconcile the ideas from the MTC and limitation on utilisation of information. The researchers in the area propounded that there are limits to information processing capacity after a certain chunks of information is received[39].

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[38] Heisenberg Uncertainty Principle, available from https://plato.stanford.edu/entries/qt-uncertainty/ retrieved last on 14.08.2017
[39] As mentioned in Jacoby (1984)

This idea was popularised by Simon (1974) who is credited with his work on bounded rationality and won the Nobel subsequently. These approaches put a limit to the inverse relationship between information as a quantity and uncertainty as an impact of lack of information till the processing capability can handle. A situation of excess of information beyond processing capability was termed as information overload which has been empirically studied by Malhotra (1982) and Jacoby (1984). If one attempts to plot the information on horizontal axis and risk (the measurable part of uncertainty) or uncertainty on the vertical axis based on the above understanding of interrelationship between information and uncertainty, a U-shaped curve is obtained. An illustration of such a curve is presented in Figure-2.1 below. The curve illustrates an inverse relationship between information and uncertainty up to a certain point and a positive relationship after that point. The downward falling part of the U-shaped curve shows the relationship propounded by the MTC while the positively rising part represents the understanding from cognitive sciences and philosophy. In a situation of certainty, the bottom of the U-shaped curve would touch the horizontal axis.

Figure-2.1: Relationship between Risk/Uncertainty and Information

Source: An illustration by the researcher
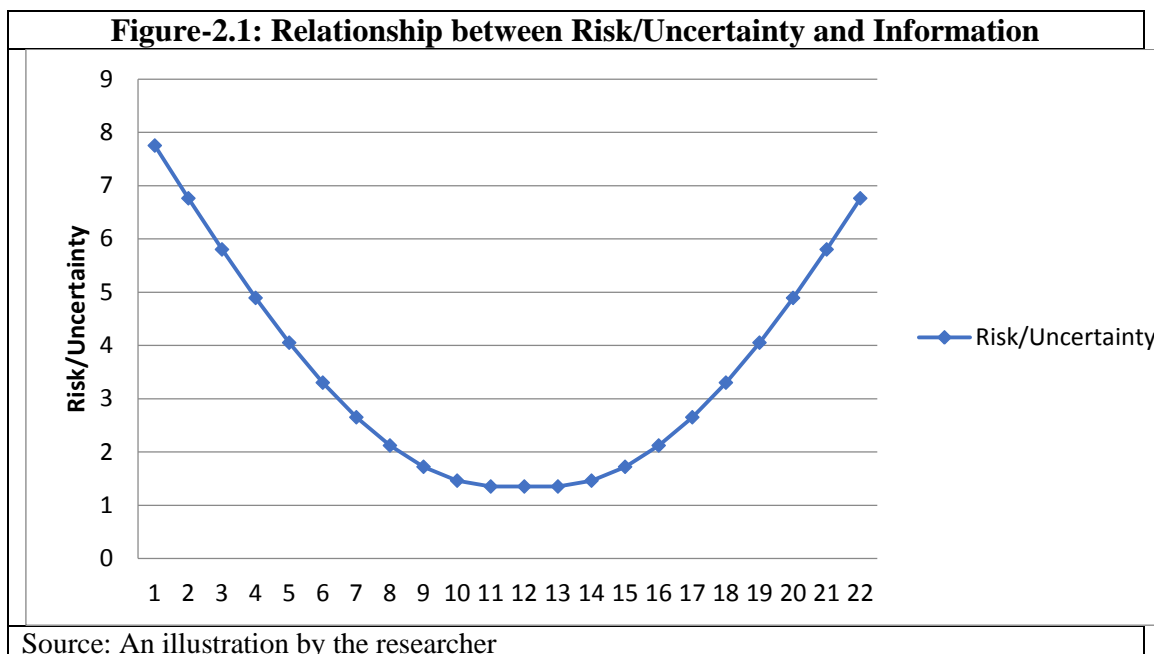
The depiction above treats information and uncertainty in quantitative form. These considerations of uncertainty to be a situation caused by an external factor (lack of information) changed when Kahneman & Tversky (1982) added internal attributes such as expectations and surprise associated with the outcome of the decision.

Kuhlthau (1993) in her study found uncertainty to be a cognitive state and not merely lack of information. She defined uncertainty as follows-

> *"Uncertainty is a cognitive state that commonly causes affective symptoms of anxiety and lack of confidence. Uncertainty and anxiety can be expected in the early stages of the information seeking process (ISP). The affective symptoms of uncertainty, confusion, and frustration are associated with vague, unclear thoughts about a topic or problem. As knowledge (information) states shift to more clearly focused thoughts, a parallel shift occurs in feelings of increased confidence. Uncertainty due to a lack of understanding, a gap in meaning, or a limited construct initiates the process of information seeking. (p. 111)"*[40].

Conceptualisation of uncertainty as a cognitive state brings in focus the role of meanings conveyed by information with comparison to the understanding of uncertainty as lack of information even with a limit. It is the lack of understanding the meanings conveyed by information, which generates the feelings of anxiety, lack of confidence, frustration and unclear thoughts. This lack of understanding might be the result of lack of information (quantity) or the quality of information in terms of meaning. With different factors behind and in differing degrees, uncertainty might take different forms. Different forms of uncertainty are compiled by Tanners *et al* (2007) in the taxonomy of uncertainty proposed by them, presented below in Table 2.1. There are two forms of uncertainty- objective and subjective. Objective uncertainty refers to informational uncertainty related to past, present and future states of the world (Schunn & Trafton, 2012). This informational uncertainty can be of two kinds-epistemological and ontological (Rotmans & van Asselt, 2001). Epistemological uncertainty arises due to lack of knowledge related to a phenomenon. It also covers the limits to know (information processing mentioned above). This uncertainty can be overcome by accessing, utilising and producing knowledge, that is, this calls for research based decisions. The other form of objective uncertainty, ontological uncertainty indicates situations involving stochastic features which are difficult to be understood and resolved, for example financial markets. Situations characterising ontological uncertainty often lead to quasi-rational decisions as rational decisions seem impossible with (very) limited understanding. The other form of uncertainty is related to the inability to apply appropriate moral rules and is knows as subjective uncertainty which can lead to societal anxiety or conflict. When subjective uncertainty arises from the inability to attach values to possible consequences, either

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[40] As quoted in Kuhlthau (1999)

due non-availability or ignorance of values, it is called ethical or moral uncertainty (Bradley & Drechsler, 2013). In this case, decision makers are guided by moral rules. But when a decision maker is confronted with choosing out moral rules to make a decision, (s) he falls into another subjective uncertainty called rule uncertainty. In such a situation, taking recourse to intuition remains the option in comparison to information and explicit or implicit rules.

Thus, uncertainty is closely related to information in terms of quantity and quality. Different forms of uncertainty are effects of different situations arising out of different presentation of information. It becomes necessary, then, to understand information in its different manifestations.

Table-2.2: Taxonomy of uncertainties and decisions				
Forms of Uncertainty	Uncertainty			
	Objective Uncertainty		Subjective Uncertainty	
	Epistemological	Ontological	Moral/Ethical	Rule
Impact on Decisions	Knowledge guided decision	Quasi-rational decision	Rule guided decision	Intuition guided decision
Source: Tanners *et al*, 2007				

2.5 Information in Economics:

The role of information has been acknowledged by economists for long. Adam Smith in his Wealth of Nations (1776) mentions "ignorance and misinformation must always, more or less, mislead the most upright council (p-702)". While he also recognised the role of other related factors in decision making, the classical economists preferred to focus on the other factors, and assumed rational economic agents and a world of perfect information. This is manifested in the characterisation of perfect competition whose one of the assumption is perfect information available to all agents in the market. Here, perfect information implies all relevant information required by agents such as producers having access to all information related to supply of inputs and their costs, labourers having access to all relevant information related to wages; and buyers having information related to quality (homogenous products) and prices. This conceptualisation of perfect information is quite different from the assumption of perfect information in game theoretic context where perfect information implies to a situation when each player knows the timing and order of the moves or states of the game.

Despite mentions of roles of information albeit scant, the classical economists tended to ignore the importance of information as they assumed perfect certainty. In the early twentieth century, classical economists tended to substitute the notion of probabilistic risk for the perfect information. Thus, actuarial certainty replaced the perfect certainty (Davidson, 2011). As Stiglitz (2002) puts this in his Nobel lecture,

> *"Of course, everyone recognised that information was in fact imperfect, but the hope, following Marshall's dictum "Natura non facit saltum", was that economies in which information was not too imperfect would look very much like economies in which information was perfect (p-461)*[41]*."*

Under this ergodic axiom, decision makers do not make persistent errors since the future is known in a probabilistic statistical sense[42]. This device of statistically reliable estimates of probabilistic risk for the meaning of uncertainty permits mainstream economists to preserve most of the analysis of the classical perfect certainty presumption. The non-probabilistic classical theory utilises ordering axiom in place of ergodic axiom to preserve the analysis with perfect certainty. In such models, true uncertainty would occur only when the decision maker cannot conceive of a complete list of consequences that will occur in the future or the decision maker cannot assign weights according to preferences to all consequences due to lack of sufficient evidences. The year 1921 witnessed the publication of two classics; one by Knight (mentioned above) and the other by Keynes. Knight demonstrated the limit of ergodic axiom by differentiating risk from uncertainty based on measurability of probabilities in terms of frequencies or propensities while Keynes in his book *Treatise on Probability* questioned the ergodic axiom. Keynes (1921) in his rejection to relative frequency theory of probability argued for balance between relevant knowledge and relevant ignorance instead of balance between favourable and unfavourable cases (p-91). This shift from epistemological uncertainty of the classical system to ontological uncertainty raised by Keynes was not given due attention by fellow economists (Weintraub, 1975).

Hayek was the first economists from the neo-classical tradition to criticise the conventional assumption of complete information in his two papers published in 1937

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[41] The Latin phrase "*Natura non facit saltum*" means nature makes no leap, that is, in nature, things change gradually, available from Online Merriam-Webster Dictionary , https://www.merriam-webster.com/dictionary/natura%20non%20facit%20saltum retrieved last on 18.08.2017

[42] The ergodic axiom implies that if the path of the economy over time and into the future is governed by stochastic process, then the future outcome of any current decision is determined with the help of a probability distribution.

and 1945. Hayek (1937) argued that the assumption of complete information on the part of everyone is in fact used by economists to evade the problem arising out of lack of information processor. He writes,

> ....*there is (here) a problem of the Division of Knowledge which is quite analogous* to, *and at least as important as, the problem of the division of labour. But while the latter has been one of the main subjects of investigation ever since the beginning of our science, the former has been as completely neglected, although it seems to me to be the really central problem of economics as a social science. The problem which we pretend solve is how the spontaneous interaction of a number of people, each possessing only bits of knowledge, brings about a state of affairs in which prices correspond to costs, etc., and which could be brought about by deliberate direction only by somebody who possessed the combined knowledge of all those individuals. And experience shows us that something of this sort does happen, since the empirical observation that prices do tend to correspond to costs was the beginning of our science. But in our analysis, instead of showing what bits of information the different persons must possess in order to bring about that result, we fall in effect back on the assumption that everybody knows everything and so evade any real solution of the problem (p-49).*

Hayek's use of the words 'knowledge' and 'complete information' are in lieu of 'information' and 'perfect information' respectively. It is to be noted that complete information in the game theoretic context implies a situation where each player knows all other players, their strategies and corresponding payoffs of each player (Floridi, 2010). Hayek (1945) mentioned, once again, the lack of perfect information and raised the issue of equilibrium for society involving limited information available with people who differ in their possession of information. He, here, seems to be coming closer to Keynes on the issue of balance between relevant information and relevant ignorance. He reiterates his lack of information argument and advises against the use of perfect information assumption prevalent in the neo-classical economics in his Nobel lecture delivered in 1974.

> *To act on the belief that we possess the knowledge and the power which enable us to shape the processes of society entirely to our liking, knowledge which in fact we do not possess, is likely to make us do much harm*[43].

Hayek's colleagues from Chicago, George Stigler and Gary Becker came up with their seminal works in the 60s. While Stigler in his two papers published in 1961 and 1962 looked into how uncertainty works and information plays a role with respect to

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[43] Hayek's Nobel Lecture-"The Pretence of Knowledge", available from http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1974/hayek-lecture.html, retrieved last on 19.08.2017

it, Becker (1964) in his famous book brought forward the informational forms of capital imparted through education and training to generate human capital. Around the same time, Machlup's book on production and distribution of knowledge, first of its kind of scholarly work, was published in 1962. This book led to the emergence of much-used terms these days like 'knowledge industries', 'information society' and 'information revolution' in economic vocabulary (Braman, 2005; Lin, 2008). Stigler (1961) rightly places the evolution of information in the cotemporary period "in a slum dwelling in the town of economics".

Stigler and Becker both won the Nobel Prize for their above mentioned works. But the first Nobel Prize for work in the area of information is considered to be won by Kenneth Arrow in 1972 (Braman, 2005). While the 70s witnessed two more awards of Nobel Prize for work in the area of information, it was Akerlof's paper in 1970 which introduced the world of economics to information asymmetry and made a long lasting impact through impetus for further research. Spence's work on education as screening device in 1974 was another milestone. The existence of information asymmetry is now well recognised in the literature after seminal works by Stiglitz and Spence. Various facets of information asymmetry, rationality and game theory, intellectual property rights (IPRs), and monetary markets are some of the examples of areas in which research relates to information. The way information is understood and dealt with in economics will be presented in the sections that follow.

2.5.1 Economic value of information

As mentioned above, information derives its value from the meaning it conveys. That is, information bears utility for its user in the economic sense (Arrow, 1962). So, information has to be value-adding and value preserving such as timeliness, relevance and being up to date (Birchler & Butler, 2007). It has also been mentioned above that the cost of replicating information is almost zero. This infinite reproducibility of information implies (almost) zero marginal cost, which makes it difficult to conceptualise information as an economic good. That is why one of the key issues in economics of information is the difficulty of appropriating the returns to creating information (Stiglitz, 2002). Chicago School economists like Stigler (1961) were so much concerned with accounting for the real costs of information that they ignored the impact of information imperfection on economy.

In the context of ascertaining economic value of information, it is important to understand what is used and what is valued. A user would use the meaning or the news conveyed by information while information is always communicated through a source, as sender(s), receiver(s) and source are three important elements of transmission of information. So, if a potential user wishes to buy information, (s) he would buy the source (as good or service) or the information itself. In strategic situations, information might also be sold and bought but for a general user source is the commodity[44]. Thus, a user pays for the information source even before coming to know the usefulness of information (*ex-ante*). The examples are purchasing newspapers, magazines, and telephone and internet services. As the user/receiver pays for the source, the amount of information available to an individual is often uncertain (March & Simon, 1963). Arrow (1962) has mentioned another reason why a user would not buy information rather the source. He mentioned indivisibility of information as an essential feature which restricts it to be bought by the user. Stiglitz (1984) showed that there was a fundamental non- concavity in the value of information, that is, under quite general conditions it never pays (appears useful) to buy just a little bit of information. Though Scarf (1994) did not felt these properties preventing information to be bought by the user, the indivisibility of information identified by Arrow and non-concavity of information shown by Stiglitz can be explained using the elements of cost of information by Lamberton (1998a) in the context of collection and use of information as-

> *The cost of information will depend on the frequency of observation, the static or dynamic nature of the information, the degree of accuracy needed, the promptness with which it must be made available, the complementary information required, and the universality of its distribution (p-351).*

As mentioned above, information is the inverse of uncertainty albeit up to a certain extent or limit. Up to that limit (varies for people), the more information one has, the less uncertain (s)he becomes about the behaviour of any phenomenon or situation. Unlike most other goods, information on the levels of basic product characteristics attributes reliability (variance) and similarity (correlation), which are inherent to information (Sarvary & Parker, 1997, p-26-27). The utilities expected from consumption change under uncertain future depending on the probability of

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[44] Strategic situations, here, refer to information gathering by intelligence units of governments, police and corporations.

occurrences of the event for which the consumption is scheduled (Varian, 2003). The degree of availability of information tends the probability towards one. Thus, the more the information availability is, the less is the risk from uncertainty. On the contrary, lack of information (or wrong information) is equivalent to a shift in the perceived supply (or demand) functions and thus has impact on both individual and societal benefits (Hayami & Peterson, 1972). The value of information (or of an information source) is the increase in the utility an individual expects from receiving the information (or the actual news) and from optimally reacting to it (Birchler & Butler, 2007). A piece of information is meaningful because it allows probabilities to be revised. The revised probabilities present a different picture of uncertain phenomenon and facilitate the optimal action. Thus, the economic value of information is the expected utility that results into willingness to pay a corresponding price for it when the expected utility in the presence of information is greater than that of the expected utility in the absence of it (ibid, 2007).

The value of information, represented by a signal to the player (of a game or game like situation) depends on-the stakes, i.e. the size of the pay-offs, the prior uncertainty, the precision of the information, and the degree of risk aversion. For example, in the standard portfolio investment problem where the payment for a signal correlated with the distribution of possible asset return realisations is subject to the investor's overall budget constraints, the investor's willingness to pay determined as his/her compensating variation between the informed and the uninformed states (Weber & Croson, 2002).

Collecting information entails some cost. A consumer has to incur this cost when (s) he goes for searching. When the seller advertises the product, then also the price of the product includes the cost of advertising (Stigler, 1961). In a way, advertisements are sold jointly with the product. The cost of search may vary from goods to goods, buyers to buyers and markets to markets. The larger the size of the market, the higher is the cost of search by the consumers (Stigler, 1961). Eisgruber (1978) argues that information has decreasing marginal returns and increasing marginal costs. So, beyond some degree of accuracy, social benefits are not improved with improved information. This presents an analogy for uncertainty which does not decrease with increase in information after a certain point. Moreover, as information collection entails some costs on the collector, it has some price value, if not exact market price. This seems to explain why Marschak (1968) considers information as

one of the important determinants of both the expected pay offs and expected cost. An illustrative curve, Figure-2.2, to explain these features of information is presented below. The inverse U-shaped curve denotes the decreasing marginal returns of information. After it reaches a maximum, the marginal returns become negative. This indicates the situation where a user finds oneself unable to handle the quantity of information available and hence each successive unit of information makes the user more uncertain. The limitation to handle information or uncertainty would apply even if information is available for free. In that situation, marginal utility would be the better term instead of marginal returns of information.

Figure-2.2: Marginal Returns of Information

Source: An illustration by the Researcher
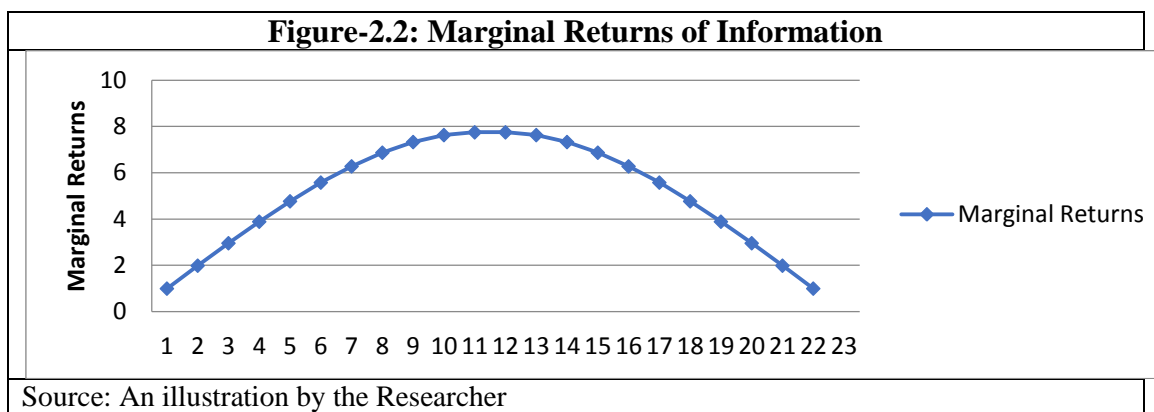
Information sometimes has a clear and a precise date of birth but often evolves being clarified with the associated uncertainty diminishing over time, and often it has a use by date to be guessed (Lamberton, 1998b). This might apply more to strategic situations, when information once used becomes useless for others, even if the actions of the information users reveal the used information. From the point of view of strategic use of information, a piece of information that destroys suspense may have negative value (ibid, 2007). For Example, trade secrets, insider trading etcetera. That is, a piece of information is not immutable, its usefulness depends on contexts and the bits added to the puzzle to a variety of ways in which contexts will be changing (Lamberton, 1998b).

Arrow (1973) postulated that information creates economies of scale throughout the economy. Wilson (1975) showed that information may induce economies of scale even if the physical production process has no economies of scale. If the information is to be bought, then the perfection or the degree of betterment of the decision-making process due to the availability of information determines the degree of economies of scale –the better the information the higher the economies of scale. Based on different

levels of information acquired by the buyers about a certain product and information acquired by sellers regarding the needs of the buyers, different forms of markets are created. Information has facilitated different forms of price-discrimination depending on the personalised needs of the buyers (Varian, 2003). Such instances of private value of information differ significantly from public value of information depending on their objectives (Eisgruber, 1978). The same piece of information kept confined can lead to benefits for the individual or group of individuals keeping the information confined. But if the same piece of information benefits the society at large, it may cost to some individuals or group of individuals. Thus, there arise issues of costs and benefits accrued at private and societal levels indicating an examination of information to ascertain whether it is a public or private good. This discussion is presented in the following section.

2.5.2 Information as a good

Classical political economy, as discussed above, did not give much attention to information in their pursuit and analysis. One of the reasons for this neglect was the fact that information was considered a free good (Lamberton, 1998a)[45]. Neo-classical economists, in their effort to preserve the analysis of equilibrium from the impact of imperfection of information, resorted to treat information as a *"thing/good, state/space, entity/inductive inference or computational object"* (Mirowski, 2007). This treatment helped them to account for cost of information and keeping their analysis unaffected. Arrow (1962) pointed out the difficulty of creating a market for information owning to the indivisibility of information, low cost of production and transmission of information, and experience good character of information[46]. These characteristic features of information are discussed in detail in the preceding section. Eisgruber (1978) views information as a system, not a product, with no market price, no physical dimensions, and no easily observable impacts. He also mentions that social benefits of information differ from private benefits. These features indicate existence of externalities. Since positive externalities to society at large is more than private returns to right holders, the positive costs associated with pricing of

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[45] Lamberton (1998a) cites illustrations of librarians used to plead for free and publicly provided libraries; scientists expecting free access to databases, serials and books and academicians in general advocating free flow of knowledge. Similar is the case for Internet today.
[46] Arrow described the experience good character of information as a fundamental paradox on the demand side as the prospective consumer cannot determine the value of information before using it.

information through copyrights and patents not only lead to underutilisation of information but also involve trade-off between static and dynamic efficiency (Benkler, 2006; p-36). Moreover, "information is both input and output of its production process" (Benkler, 2006; p-37).[47] This interrelationship can be seen in the case of innovation and knowledge generation. Information as a good is characterised with non-rivalry, non-excludability and almost zero marginal cost of production (Floridi, 2010; p-90)[48]. These properties of information suggest smooth and open flow of information for better utilisation. Thus, utilisation of information would be better or can be maximised when information is a public good.

However, assuming information to be a public good ignores the strategic use of information. As Sarvary & Parker (1972) state

> "---------*Information does not perish when used but it cannot be resold after consumption', or it gets revealed in the actions of the information-users*"

Information might not be perishable after consumption but the consumption takes away the strategic importance that it might have commanded before consumption. Viewing information from the point of view of its strategic use along with cost of collection, the financing of information suffers from free-rider problem. In a competitive situation, free rider problem exists for the financing of information as a public good because no firm would want to unnecessarily increase its cost of production by financing information. Carlton (1980) puts forward an example to show the nature of information to be a public good. Information about future demand conditions of a given commodity is, in a world of a large number of buyers and sellers, a public good. There is a free rider problem in the financing of this public good (collecting information) from the point of view of sellers of the commodity while those demanding information prefer random prices, that is, no production of public good. Consequently, in a competitive situation no information will be bought and therefore the outcome will be inefficient. Information here is some sort of public input for sellers. Hence, when the seller is a monopoly, it is in his interest to finance information gathering, in fact, the free-rider problem disappears. This is where IPRs

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[47] The advancements in Information and Communication Technologies have propelled the growth of information –intensive services like communication and entertainment, and information oriented (quasi) public goods like education and health. The growth of these services requires and generates data and knowledge, the various manifestations and forms of information (Floridi, 2010, pp-3-4).

[48] A commodity is non-rival if its use by an economic agent does not restrict the ability of other agents to make use of it.

are brought to play their roles in creating some sort of temporal monopolies to overcome free-riders problem. Alternatively, a positive effort is required to make information excludable such as intellectual properties, non-public data, and military secrets etcetera. IPRs are granted to provide an economic incentive to their beneficiaries to develop and share their information (regarding their creations of mind) through a sort of temporary monopoly (Floridi, 2010). Similarly, the provision for trade secrets in the TRIPS and prohibition of insider-trading in some countries indicate the existence of non-public (private) information. The possibility of strategic use and economic incentives (IPRs) to restrict the use of information make information a positional good. The unique feature of such goods is that enjoyment is greater when it is available to a minority (a few) and diminishes as consumption spreads through the community (Hirsch, 1977)[49]. Thus, an information leadership on the lines of price leadership might develop under the IPR regimes, treating firms as "an incompletely connected network of information" (Lamberton, 1998a)

Thus, Intellectual Property can be conceptualised as consisting of units of information. Though the conceptualisation is too simplistic, it gives an opportunity to unravel crucial insights of the IPR regime which provides *privateness* to information. The IPRs which ensure private rights on the cost of curtailing public access to information thus increase the level of uncertainty for the society travelling on the path of technological innovation. So, IPRs in their attempt to encourage innovation potential of individuals may end up reducing the overall innovation potential of the society. For example, under the previous process- patent regime, pharmaceutical firms could come up with alternate processes to manufacture same products but under the present product- patent regime, the enhanced restrictions on information has curtailed the innovation potential of the industry as a whole while benefits accrue to individual or some patent holders. Thus, the private good features in information are partly intrinsic (such as strategic use) and partly policy generated (IPRs).

Information as Global Public Good (GPG)

As discussed above, the features associated with information, non-excludability, non-rivalry, externalities; (almost) zero marginal cost of production and free-rider problem in financing of information make information eligible to be considered as a public good. Policies related to transparency such as E-governance utilise these features of

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[49] As quoted in Lamberton (1998a)

information. While restricting the flow of information through policies aim at incentivising producers of information (such as content, knowledge etcetera), availing information to wider population aids the overall development of society and also encourages innovations. Information thus is a candidate to be considered as a Global Public Good (GPG). To understand the points more clearly, let us take the example of scientific inventions being carried out in universities and firms simultaneously. Since all inventions depend on existing stock of knowledge, there is a path of dependency. Again, the stock of knowledge being huge and getting compiled from many generations around the globe, it is difficult to assign IPRs to all of them. So, a large chunk of knowledge which is not protected is used again and again in driving further inventions making both the cumulative and sequential knowledge very crucial to the stock. Thus, a comprehensive transnational system treating knowledge as a global public good appears to be indispensible. Maskus & Reichman (2004) put forward cases of GPGs getting privatised while IPRs make private knowledge goods globalised. Here, GPGs are public goods with cross-border externalities. For example, pollution or financial volatility in one country may affect the other country as well. Similarly, innovation and knowledge generation in one country is closely linked with other countries and the effects are interrelated. Maskus & Reichman (2004) suggest following solutions for better provisioning of GPGs-

1. Nurturing a Transnational system of innovation through an institutional infrastructure for reconciling existing IPRs with National and Regional systems of innovation.

2. Maintaining the supply of knowledge as a GPG through rationalising the protection of cumulative and sequential innovation.

2.5.3 Information and Economy

The general equilibrium analysis stresses on prices as means to convey information for once and for all whereas in reality, information processing occurs continuously and decisions too are made continuously based on the flow of information (Stiglitz, 1985). Stiglitz also argued that economic equilibrium has limited validity as it is susceptible to the slightest altercations in informational assumptions. These arguments suggest the importance of the ways in which the symbolic content of information flows and the effects on the economy. These effects might not be direct rather might act as subset(s) of the overarching impact of symbolic communication on society. The

linkages between information flow, processing, and symbolic message delivered by information necessitates a specific role for the media in sustaining a particular set of economic relations as the nature of the economy changes as a result of learning from the content of informational flows. These linkages are yet to be recognised in economic theory.

As explained above, neo-classical economists have been attempting to safeguard the methods and equilibrium analysis from the impact of information by either showing inapplicability of information in analysis or co-opting information in the form of cost element. The broader role of information is yet to be recognised. This recognition would require an overhaul of theoretical apparatus due to peculiarities associated with information. As for illustration, "while there is a single way in which information is perfect, there are an infinite number of ways in which information can be imperfect" (Stiglitz, 2002). The way economics deals with perfect information acting as some sort of constant for model building; imperfect information brings the variability of information forth. The most fundamental reason that markets with imperfect information differ from those in which information is complete or perfect is that with imperfect information, market actions or choices convey information (Stiglitz, 1984). Information which itself conveys messages gets revealed through actions. Such actions are called signalling in the economics literature and will be discussed in the next sub-section.

The efforts to safeguard mainstream economics is not limited to treatment of information as not easily appropriable but also involves very poor recognition accorded to information competence of individuals and organisations. Though Arrow (1974) pointed out the existence of organisation obsolescence arising out of uncertainty, indivisibility of information and structural features of organisation; such obsolescence persists even among economists who are unwilling to change (Lamberton, 1998a; p-345). Stiglitz (1985) also stresses the need for experimenting with models in which information processing and consequent decision-making is treated continuous. Lamberton (1998a) proposes typology to cover the overarching impact of overwhelming and continuous presence of information. His typology of definition of information is as follows-

1. **Information as a resource:** This typology treats information as a capital or a factor of production and is based on endogenous growth models wherein information or knowledge is included in production function. Going beyond

the economic use of information, Floridi (2010, p-105-106) establishes availability, accessibility and accuracy of information as resource for moral behaviour and justice.

2. **Information as a commodity:** This typology focuses on information as a product and seeks to assess information through actual use. As for illustration, use of telephone communication to be identified by duration of call, frequency of call and distance of the sender and receiver instead of measuring telecommunication infrastructure. Information as a commodity, from an ethical point of view, may cover moral issues arising out of accountability, liability, and pragmatic rules of communication which include plagiarism, advertising, misinformation, propaganda (mediatisation mentioned above) etcetera (Floridi, op cit).

3. **Information as perception of pattern:** This typology seeks to capture information available from environment and as a public good. The perception, competence of use and patterns of these processes by individuals and organisations would comprise this third typology. The ethical angle of information available through open access, freedom of expression, intellectual property and respect to privacy add prominence to this typology (Floridi, op cit).

4. **Information as a constitutive force in society:** This fourth typology covers information communicated through belief systems, socialisation, norms and other social and cultural processes. This typology goes beyond the traditional notion of rationality and use of information. The understanding of uncertainty as a cognitive state, described above, provides basis for such typology as uncertainty and information bear unique relationship at different stages of acquiring information. One instance of such typology could be behavioural economics which seek to study the economic behaviour of individual(s) and groups through incorporating understanding from psychology.

These typologies seek to cover all possible manifestations of information so that information can be included in model building and understanding the world around us. Information available to us influences our desires, taste and preferences and ultimately our choice and decision making. The next section presents a discussion on these interlinkages.

2.6 Information, Choice and Decision making:

Choice and decision making in certainty involves choosing out of known alternatives whereas the choices under uncertainty become choosing out of gambles or prospects (probabilities either attached to or inferred from the alternatives). In situation of certainty the alternatives do not have internal structure but in the situation of risk (segment of uncertainty measurable by calculable or inferred probabilities) gambles have internal structure as each gamble has an outcome (payoff or prize) and probability associated with it (Allingham, 2002, p-31). The situations of certainty and uncertainty are marked by both quantity and quality of information available to the decision maker. Davidson (2011) lists two factors behind decision making under uncertainty- (a) the conception of the cause of uncertainty in the external economic reality and (b) the ability of agents to understand that reality. A discussion on conception of uncertainty in the economic reality has been presented above. The next sub-section proposes to deal with the ability of understanding the reality. In the spheres of choice and decision making, the ability to understand the reality has been presented under the ambit of rationality. The next sub-section presents a detailed account of the concepts of rationality and their implications for choice and decision making.

2.6.1 Rationality

As an offshoot of the Enlightenment, many nineteenth century thinkers (such as Laplace and Lipps) believed that human inference is equivalent to the laws of probability and logic (Chase *et al*, 1998). Such visions of human inference continued to prevail among psychologists and economists in the early twentieth century[50]. In the discussion on choices and rationality in the first chapter, it has been mentioned that in traditional mainstream Economics reason drives desire. Economic theory has traditionally assumed economic agents to be rational in the sense that they maximise their objectives. The maximisation process itself consists of availability of perfect information on the part of all agents. The preferences of agents are assumed to be exogenous, consistent and transitive. The rational behaviour at the levels of households and firms lead to rationality at the market level. This rationality leads supply to rise and demand to fall when prices rise. The standard relationships between

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[50] Chase et al (1998) in their review of Visions of Rationality quote from the works of Laplace (astronomer), Lipps (Philosopher), Peterson, Beach and Piaget (Psychologists)

variables such as inflation and wages, investment and rates of interest etcetera are governed by the notion of rationality.

In the first chapter, the three pillars of concept of rationality in traditional economic theory were also discussed-(i) availability of perfect information, (ii) preferences-exogenous, consistent and transitive, and (iii) maximisation of objective functions such as utility for consumers and profit for firms. As a rational individual is assumed to possess all relevant information, the phenomenon of information processing attains crucial importance. This phenomenon may be direct or indirect through society and institutions. The concept of rationality revolves around the ability of the consumer to collect and process information to arrive at an efficient decision. Thus, the concept assumes all the consumers to be equally capable in collecting, handling and processing information.

A rational consumer, in neoclassical economics, always selects the most preferred alternative from the feasible set. While this assumption restricts choice and preferences to diverge, preferences are assumed to be consistent, exogenous and transitive. Such preferences can be ordered as the consumer reveals his/her preferences. Samuelson's revealed preference theory dominated the understanding of choice and decision making in economics for a long time since its introduction in 1938. This idea was first challenged by Herbert Simon who coined the term bounded rationality, which he defines as-

> "....rationality is bounded when it falls short of omniscience. And the failures of omniscience are largely failures of knowing all the alternatives, uncertainty about relevant exogenous events, and inability to calculate consequences" (Simon, 1978, p-356)[51].

According to Simon, bounded rationality is characterised with two central features-search and *satisficing*. So, the concept of bounded rationality in a way refers to the limits to the amount of information that individuals can search and process. Simon discussed two types of constraints on decision makers- time and cognitive. Though Simon was concerned with behavioural attributes, the constraints might be interpreted in economic sense as well. The time constraint may be due to cost associated with searching information or paucity of time between one course of action and another. Simon, however, challenged the attribution of cost to information search,

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[51] The term 'bounded rationality" first appeared in the introduction of the third edition of Simon's book *The Administrative Behaviour* in 1976; Takahashi (2015) presents a detailed review of all four editions of the book

as mentioned in the discussion above. He discussed cognitive constraint as computational capacity constraints. In the context of web based decision making, this constraint takes the form of information overload both within the individual site and the Web as a whole. Information overload may be different for different observers. Some may prefer textual paragraphs some may feel them as textual overload and prefer graphic and multimedia. Moreover, the phenomenon of information processing is characterised with complexity and limited ability of the individuals to gather and process information (Simon; 1978, 1982). This differentiates *substantive rationality* of neoclassical economics from *procedural* or *bounded rationality* introduced by Simon.

Revival of Neoclassical Rationality

There have been attempts to revive the neoclassical notion of rationality after the challenges posed by other disciplines. These attempts of revival can be classified under three theoretical developments- (i) Rational Expectations Theory, (ii) Statistical Decision Theory and (iii) Game Theory. These attempts of revival are discussed in brief.

(i) Rational Expectations Theory

When Simon was challenging the neoclassical notion of rationality in economics, one of his teammates of the Management Science Inquiry team which developed a dynamic programming algorithm for firms faced with uncertain and fluctuating production demands, J.F. Muth (1961) went on to interpret the decision rules developed by the team as a paradigm for rational behaviour. He suggested that expectations should be treated as predictions of relevant economic theory as expectations are based on informed predictions of future. He presented this as-

> *"The hypothesis can be rephrased a little more precisely as follows: that expectations of businesses (or, more generally, the subjective probability distribution of outcomes) tend to be distributed, for the same information set, about the prediction of the theory (or the "objective" probability distributions of outcomes)"(Muth, 1961, p. 316).*

Here, it seems that Muth attempts to find equivalence of average subjective expectations of economic agents to the mathematical expectation of the variable. Thus, Muth himself seems conceding on the expectations of given individual(s). Lucas (1972), in his attempt to reintroduce the rational expectations theory, mentioned that the economic agents get sufficient time to understand the phenomenon, its features and alternatives available to them as the phenomenon posses

stability and regularity to allow the required time. Simon (1978) and Machlup (1983) have questioned the use of the term 'rational' by the proponents of the theory. They argued that the theory merely tends to present consistency preconceptions (subjective) and prejudgements (objective). While suggested the theory be known as "consistent expectations rule", Machlup proposed it to be called "correct expectations theory" in terms of matching expectations of neoclassical economists. The proponents of the rational expectations theory tried to take back economic agents to the ergodic world. A discussion on the limitations of ergodic axioms has been presented above in the first section of this chapter.

(ii) Statistical Decision Theory

This refers to utilisation of statistical methods to reach at optimal decisions incorporating risk. As mentioned above, alternatives (gambles or prospects) have internal structures under risk as each gamble has payoffs and probabilities associated with these payoffs. Statistical Decision Theory assigns utilities to these payoffs based on preferences of the decision makers and maximises the expected utility. Schoemaker (1982) presents a detailed review of nine variants of expected utility models. Some of the earlier expected utility models date back to the eighteenth century. The models differ in their use of cardinal utility and manner in which they incorporate probabilities (to incorporate risk). These variants, in a way, give recognition to the individual differences in dealing with probability. Simon (1978) opines that the expected utility models require "heroic assumptions about the information the decision maker has concerning the probability distributions of the relevant variables, and simply increases by orders of magnitude the computational problems". The expected utility models bring forth the weakness of the neoclassical rationality in their effort to revive it.

(iii) Game Theory

Floridi (2010) defines game theory as the formal study of strategic situations and interactions among rational agents who always maximise their payoffs. Simon (1978) finds game theory to be involved in "outguessing" problem arising out of an agent's taking considerations of possible reactions to his own decisions of the other agent(s). Binmore (2007) cites notable paradoxes and fallacies associated with different types of games. For illustration, in the Prisoner's Dilemma, both the players would be better

off if they do not play their equilibrium strategies. The rationality assumption leads both of them towards irrational outcome. If in a game both the players are made aware of each other's strategies, payoffs of both of them decreases, known as common knowledge problem[52]. This implies that if information is made public, it might lead to decreases in benefits to society, contrary to perfect information assumption of classical economics. The negative value associated with strategic information has been mentioned in discussion above. The resolutions to these problems and fallacies in particular cases do not meet the challenges to safeguard notions of rationality.

Reconciliation of Bounded Rationality

The changes in the understanding of rationality and the attempts of its revival have also been accompanied by some efforts to reconcile the concept of bounded rationality. Though much of this reconciliation has little impact on mainstream economics, the developments in emerging nuances of rationality have led to the enhanced understanding of choice and decision making. The interrogation of revealed preference approach postulated by Samuelson in the light of bounded rationality is one such illustration. The adherence to the "final choice reveals preference" axiom was questioned by Majumdar (1980) who suggested adapting and learning methods from other disciplines such as logical cross-examination of intent used by Law, Philosophy and Sociology. Sen (2002) also emphasised that the concept of rationality must accommodate the diversity of reasons that may motivate choice. The traditional methods of mapping information to choice and considering preferences and values as exogenous have now appeared as limitations to understand the choice and decision making. This limited view of rationality has to be broadened with ideas from other disciplines.

There are growing number of seminal works in psychology, management and other disciplines dealing with decision and choice making, which shed light on the concept of rationality. Ellig & Lin (2001) in their work, influenced by Herbert Simon, found that there are limits to the ability of individuals to receive process and communicate information. Agosto (2002) adds physical constraint to this list to the list of constraints mentioned by Simon. By physical constraints she means the physical discomfort associated with excessive computer use, onset of boredom or information snowballing. As Agosto (2002) puts it,

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[52] The use of knowledge here means information

Human decision making regardless of context, must occur within the constraints of the human body. Human beings are not merely cognitive beings functioning under the limitations of their physicality. The cognitive-physical duality of the human condition is unbreakable.

The constraints of human body can be broadened to include distance to be travelled by an individual to access information. When Simon counts time as one of the constraints, it also includes time required to travel. So, distance imposes constraints in access to information in three jointly occurring ways- (i) bodily constraint, (ii) time required and (iii) resources required for travelling. Distance may as well be conceived as a constraint in the virtual world, in quite analogous way- (i) physical effort required in terms of number of clicks and typing required to search and navigate, (ii) time required to search and surf and (iii) resources required to access Internet.

Arrow (1975, p-18) shared the same concerns when he said that information exchange is costly not because of transmission difficulties but because it is difficult to receive. He indicated rationality in terms of intended process but limited due to constraints in and around (individual or process). Individuals and organisations are both subject to limits on their information handling capabilities, and these limits differ according to the kinds of information (Macdonald, 1996). As our beliefs, opinion and choices are guided by the kind of information we gather and process, the sources of information and intentions of the providers matter a lot. Each step related to the phenomenon of information processing is crucial to understand the concept of rationality. Though there are cognitive and computational constraints imposed by nature along with economic constraints- time and cost; an individual seeks to go through various stages of information processing before choice making.

The concept of rationality has been challenged not only due to existence of constraints but has been a subject of critical understanding through the developments in the study of functioning of brain and decision making process. Kahneman *et al* (1982) presented the role of heuristics and biases in their seminal work on judgements under uncertainty. They found that human inference is systematically biased and is aided by quick cognitive heuristics. Their findings propelled research in the area of heuristics and biases. Chase *et al* (1998) describe how heuristics based on limited search; known as fast and frugal heuristics, work in models of bounded rationality which they categorise using ecological and social rationality. As information in particular environments come in a certain form, "ecological rational heuristics are

tuned to work on specific information representations". That is, ecological rationality implies *specificity*. In such cases, fast and frugal heuristics utilise the specific information representation(s), and explain the systematic relationship of ignorance with the desired variables. Chase et al (1998) provide instances of the names of big brands, top ranking (big) universities etcetera that we recognise easily but not (or rare) that of small brands or universities not in the top ranking. They also mention instances of social rationality to show how societal norms make us not to choose the best available. Such deviations from logical or statistical principles (the concept of classical rationality) have often been classified as judgemental biases and attributed to heuristics which are governed by System I of the brain. As mentioned in the first chapter, Kahneman (2011) divides two systems of brain- fast and instinctive System I, and slow and explicitly calculative System II. System I is modified by the experiences of System II (pp-103-104). While System II uses explicit logic for decision making, the System I seek to take quick decisions using heuristics. Gigerenzer (2015) defines "heuristic as a strategy that ignores part of the information, with the goal of making decisions more quickly, frugally, and/or accurately than more complex methods". He identifies four classes of heuristics that are used for decision making and develops models of heuristics for the four classes. Their brief descriptions are as follows-

(i) **Recognition heuristics**-people will rely on this heuristic with higher recognition validity so as to attain ecological rationality. A variant of recognition heuristic is fluency heuristic. People use this heuristic when recognition for one of the alternatives is faster than others and might be the result of previous exposure or experience.

(ii) **One Reason decision making**- This refers to heuristics that are based on one reason only. For example, choosing the best on one criterion. This one criterion might be influenced by tastes and preferences of consumers who eliminate alternatives sequentially while choosing out of large number of alternatives (supermarket or online purchase) and arrive at a choice finally. Literature search for research purposes is another good example of one reason decision making mentioned by Gigerenzer (2015).

(iii) **Trade off heuristics**-This refers to heuristics which considers all alternatives and lead to trade offs. Examples of such heuristics are tallying and mapping models. Here. The factors to be taken into account for tallying or mapping are the bases of decision making.

(iv)   **Social heuristics**- These refer to social rationality mentioned above.

These different heuristics are associated with different kinds and lengths of search. Gigerenzer (2015) presents in detail the search process related to different classes and sub-classes of heuristics. Search has been crucial instrument of Chicago School economists to incorporate information into their analysis. Moreover, the process of search related the information seeker to sources of information and thus completes the sender-source-receiver cycle of semantic information.

2.6.2 Consumer Search

The above sections present a discussion on the importance of information for rationality of behavioural agents. To complement the above discussion, it is important to understand the significance of information search by consumers; the behavioural agents in the market. The discussion on information search in the first chapter, presented the distinction between internal search, external search and ongoing search- a continuous form of both the internal and external. The discussion also highlighted the role of goals and sources of information in search processes. This sub-section would go deeper to understand the nuances of search and their implications for choice and decision making.

Empirical studies related to the determinants of consumer search were limited in number till 1977 (Beatty & Smith, 1987). The existence of little research on consumer search reiterates the slow recognition of role of information in economics, as discussed above. Moreover, these studies were also deficient in terms of methodology utilised by them (*ibid*, 1987). The results of these studies indicated the existence of little pre-purchase information search by the consumers. Peterson & Merino (2003) also mentioned the limitations of research in the area before the 90s. These limitations ranged from conceptual shortcomings to methodological problems. The lack of credible literature in the area prompted researchers to offer comprehensive models, theories and frameworks. This coincides with the advent of Internet, a transformative phenomenon that has been shaping the information search behaviour since its inception and popularisation. The Internet itself is transforming gradually as a source of information, storage and medium of communication. This leads the understanding of consumer search involving the Internet to be complex (*ibid*, 2003). Though the literature on consumer search remained limited and deficient in the areas of economics and management, as mentioned above, a good deal of research has been

reported in the field of library and information science (LIS) centred on search behaviour of academicians from different disciplinary backgrounds.[53]Despite differences of goals and motives of the two categories of information seekers- consumers and academicians, the literature available from the field of LIS provide a good deal of understanding of information behaviour in the online environment and the role of expertise of the information seeker related to the information sought for. Here, information behaviour is defined as the totality of activities of a person directed towards identification of information needs, searching for such information and using or transferring the information searched (Wilson, 1999).

As discussed in the previous chapter, information is sought to satisfy some goal. The purposeful information seeking leads an individual to interact with people, going through printed materials and browsing digital media like the Internet. Since goals are pursued with respect to some context, it is the context that guides the information seeking process. User goals are the motivating factors in information seeking process, as discussed in the previous chapter. Studies after 1977 identified indices for search activities for different kind of goods as different goods associate with themselves attributes leading to different goals (*ibid*, 1987). The context(s) and goals might also influence the choice of information-source for information seeking. George Akerlof, one of the leading economists in the area of information, puts the choice of information sources as follows-

> *Decision makers have preferences over states of the world and over their beliefs about the state of the world and these beliefs persist over time. They also have some choice about beliefs given available information and they can manipulate their beliefs by selecting information sources (Akerlof, 1984, ch-7)*

While the literature on information seeking focuses mainly on goal oriented information search, there are instances of "incidental information acquisition" and "information encountering" mentioned by Ross (1999) who conducted a study on the role of reading for pleasure as source of information[54]. The study utilised open-ended

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[53] A number of papers on information behaviour of scientists and technologists were presented at the Royal Society Scientific Information Conference of 1948 (Wilson, 1999)

[54] Ross (1999) quotes the two terms from two doctoral dissertations by Kirsty Williamsons and Sandra Erdelez. Williamson (1998) used the term "incidental information acquisition" to denote information acquisition while browsing newspapers, talking to friends and so on, to distinguish them from "purposeful information seeking". Erdelez (1997) refereed to conducive situations and positive reinforcements enabling information encounters by students and staffs in an academic setting

interview with purposefully selected 194 who were voracious readers by choice. The findings of the study provided useful insights to understand reading as a hobby and as a source of information. In the context of consumer search, incidental acquisitions and encounters might contribute to ongoing search.

In the previous chapter and the sections above, we have discussed the developments in the areas of rationality and uncertainty. The consumer is now well considered as a limited information processor. This understanding has two broad implications-(i) as the consumers are faced with limited information processing capabilities, they resort to use simplifying heuristics to limit the task of information processing and (ii) the difference between *availability* of information and *processability* of information (*ibid*, 1991). The first implication leads to the identification of a number of heuristics as discussed in the above section. The second implication provides ground for understanding the structure of information along with the availability. Choice heuristics discussed below would help in understanding the first implication while sources of information and search would help to understand the organisation or the structure of information.

Choice heuristics:

In the previous section, heuristics are discussed in terms of their role in influencing the search process under the considerations of bounded rationality. As evident from the above discussion, different heuristics are used in different contexts and in varying ways. The same applies to choice heuristics. A detailed description of choice heuristics is available from Bettman *et al* (1991). A summary of the description is presented in Table-2.3 below-

Table-2.3: Features of Choice Heuristics					
Heuristics	**Compensatory**	**Processing**	**Attribute**	**Reasoning method**	**Evaluation**
Weighted Additive Rule	Yes	Consistent	Across	Quantitative	Yes
Equal Weight	Yes	Consistent	Across	Quantitative	Yes
Elimination by Aspects	No	Selective	Within	Qualitative	No
Satisficing	No	Selective	Across	Qualitative	No
Lexicographic	No	Selective	Within	Qualitative	No
Majority of Confirming Dimensions	Yes	Consistent	Within	Quantitative	Yes
Frequency of Good and Bad Features	Yes	Consistent	Across	Quantitative	Yes
Source: Bettman *et al* (1991), p-59-61					

The first column of Table-2.2 presents a list of select heuristics and the other columns depict different features associated with the heuristics listed in the first column. The first heuristic Weighted Additive Rule refers to procedures of selection of alternatives, involving consideration of all relevant attributes of each alternative and assigning weighted values to each attributes. The allocation of different weights to different attributes makes the heuristic compensatory. The consideration of all attributes across alternatives indicates consistent processing of information involving a quantitative evaluation of each alternative. When relative importances of attributes are ignored, Equal Weight heuristic can be observed. The features of Equal Weight heuristic remain the same as that of the Weighted Additive Rule heuristic. The idea of s*atisficing* heuristic was developed by Simon (1955) to explain complexity of choice and decision making. He argued that information search comes to end with the achievement of a satisfactory level of aspiration and does not continue necessarily till the best level of aspiration. The implications of such a process would be dependent on ordering of evaluation of alternatives, that is, an alternative evaluated first and satisfying a cut off level of aspirations would be chosen while other alternatives might not even be evaluated. Another selective heuristic elimination by aspects, described first by Tversky (1972), starts with identifying most important attribute and its *satisficing* level, and choice is made by eliminating other aspects not meeting the criterion such developed. The above Table-2.3, shows features of such heuristics which can be realised even in combination by consumers in different choice situations (ibid, 1991).

2.7 Information: Search and Sources

Discussion on choice, as presented above, brings forth the importance of information along with processes of search and sources. A range of sources have been mentioned in the first section on ontology of information in terms of their forms, processes of communication and the kinds of meanings they tend to convey. In this section, a detailed discussion will be presented on two categories of sources-institutions and the Internet. Understanding the role of institutions in information processing provides anvils to examine the way HEIs present themselves on the Internet and signal their characteristics.

2.7.1 Institutions and Information Processing

Information flows have their effects on individuals and society. Braman (2005) traces the developments in the micro and macro economics of information since the nineteenth century and locates the importance of communication and its effects on society. She mentions Karl Marx and credits him for introducing the critical importance of communication for the functioning of the economy as the ways in which people think about their roles within society is affected by communication or the flow of information. The roles keep changing as individual aspirations and social conditions both undergo change. Information processing helps society to keep pace with the changing challenges facing it. Society, the ultimate reflection of life, dwells on certain structures like institutions. Economists concerned with the economics of information have been concerned with institutional changes. This concern is necessary because problems addressed by society change overtime, thus requiring changes in information systems. Information systems themselves change with changes in society, innovation and change in perspectives related to them. Lamberton (1998a) advocates new perspectives on the role of information and suggests to draw them from analytical efforts to understand information as a factor of production, taxonomy of information, and a broader conceptualisation of information infrastructure.

The process of institutionalisation of information systems or particularly the information processing is linked to institutional change. Thus, when institutions tend to institutionalise information systems, they make them progressively less effective (Eisgruber, 1978). "Institutions reduce uncertainty by providing a structure to everyday life---they are perfectly analogous to the rules of the game" (North, 1990). This definition considers institutions as the humanly devised constraints that shape human interactions. Olson (1999) defines institutions as long run rules which aid in reduction of transaction costs by helping people in expecting what other people would do in situations of uncertainty. Sengupta (2006) illustrates the functioning of these rules with the help of three dimensions of information considered in a generic sense. In the first dimension, behavioural units such as individuals, groups or organisations that engage in exchange or decision-making assemble and use a body of knowledge (information) to enhance value of their actions[55]. In the second dimension, each of the units, individually or all of them collectively, wish to achieve certain well-defined

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[55] Economic exchange has a semantic dimension and hence conveys information (as mentioned in the first chapter)

objectives. In the third dimension, each of the units exhibits different behavioural responses to specific actions taken by other groups.

Thus, information processing can be seen as a part of the institutionalisation of information systems. Loomis and Rodriguez (2009) find institutions as the formal and informal rules and conventions that govern the process of collective action, production and exchange. They regard institutions as integral features of the productive base of the economy; forming the capital assets of society and function to guide the allocation of scarce resources. Institutional change can be understood as a reorganization of information, a rational adjustment to a cost difference in information (ibid, 2009). This reorganisation paves the way, in a progression of steps to a redistribution of scarce resources; a reconstruction of the image people have of their work and image people have of their work and activities, the basic empirical content of what is thought and felt; and a reconfiguration of the model in which it is organized. The process develops through the aggregation of individual choice orderings, the millions of decisions to trade-off one desire, goal or need for one another (Arrow, 1963). These trade-offs alter the form and composition of the information base which means they induce change in the provision of rules and maximizing opportunities, the direction of learning and trails, the discourse and logic- all the existing formal and informal constraints of the institution. The prospects of production and consumption, for quality control also change with such changing prospects. The expansion takes place by the displacement of particular information with universal information.

Periodic shifts in the market as from a local, to a national, to a transnational and then to a virtual market, is preceded at each change by a turnover in institutional rules (Sengupta, 2006). The institution and its rules economise the activities of all the participants where the larger institutions reduce uncertainty. The institution becomes coded for expansion at each turnover of the rules. Here the rules are the ways of furnishing or processing information. Quality is concerned in an incredible way to the local scene, to culture, and to the individual participants, their preferences, aims, the information base they represent. So, for the institutions like HEIs, information processing at a latter period depends on the processing in the present period. The alumni and the senior faculty represent the HEIs' academic environment as passed on to them. Samuel Bowles (2006) opines " Institutions influence who meets whom, to do what tasks, with what possible courses of action, and with what consequences of

actions jointly taken" This is how norms, customs and conventions get their place in institutions. Norms, customs, conventions and mores carry information about behaviours of agents engaged in interactions (Sengupta, 2006).

The quality of goods and services tend to exchange in proportion to their information content, the more complex the good is, it would seem to require a commensurate need for diversity and higher quality of information in its production (Hayek, 1967). This suitably implies to education good especially at the higher level. Loomis and Rodriguez (2009) stipulate that the education good requires for its development a human scale at each level of higher learning and a dynamic mix of particular and universal information represents the complexity. The process of information processing is embedded in the very process of delivery of education as a service. The HEIs providing a service, whose value depends on its information content, are processors of information and knowledge.

According to Ciepley (2013), HEIs both public and private can be categorised as corporations whose 'external personhood' and internal governing authority are granted by the government irrespective of their mode of financing. This categorisation is on the basis of matching features of HEIs being hierarchical, semi-cooperative and organized through authority relations with that of corporations. North (1990) conceptualises institutions as consisting of formal (statute and regulations) and informal (conventions and norms) rules. In this conceptualisation, external shared behavioural regularities) and internal (mental models or shared solutions to recurrent problems) aspects of institutions seem to be significant. He also differentiates institutions from organisations, the former being rules of the game and the latter being the players. While the categorisation by North (1990) and Ciepley (2013) puts HEIs in the category of organisations or corporations, intrinsic features of HEIs such as formal nature of establishment, conventions and norms, collegiality and peer behaviour bring out institutional aspects of them.

Like other institutions, HEIs process information as they deliver their services. They play instrumental role in channelising information towards a particular direction to create schools of thoughts. HEIs usually differ in their approaches to dissemination of knowledge and information processing. These are reflected in the books, and published articles of the HEIs. One such reflection can be viewed from the websites of institutions, which serve as reflections of information processing by them. HEIs are concerned with their reputation which provides them with opportunity to attract the

best of the talents. A reputed HEI needs less effort to attract quality faculty and students. Stigler (1961) finds reputed organisations as cost minimising firms which can sell their product at lower prices saving the cost of advertisement, economising on their reputation. While building reputation is a long process, HEIs do tend to create brand values for them and utilise all means of communication for promotion. The process of maintaining reputation and brand image require advertisement or information processing through all means of communication.

2.7.2 Internet and Search

Means of communication that influence and are influenced by institutions include the Internet as well, which has itself overpowered all other means of communication and has transformed the ways people communicate. The Internet with its openness matches the primary principles to understand information seeking in general and for youth in particular. These primary principles as listed by Dreasang (2005) are- interactivity, connectivity and access. The Internet is not merely a carriage or toll good rather it has developed symbiotic relationship with users. Davidson et al (2010) present a study on virtual institutions and their role on education in the digital age. The book itself is an example of collaborative writing using the primary principles of information seeking. The Internet, besides its interactive nature, attracts users for what it carries- information, the essence of contents and applications. The carriage (Internet) and the carried (information) appear similar on the production side as they involve huge fixed or upfront costs and small or zero marginal costs.[56] Moreover, they depend on and generate demand for each other. This is an illustration of cross group externalities which refer to the gains accruing to an economic agent on one side of the market due to the increasing presence of agents from the other side (Prasad & Sridhar, 2015). Economides (2007) terms these gains as Network Effects (p-239).

The openness of the Internet grew out of design priority assigned to it by the developers of this technology. Openness of the Internet executed through packet switching and best effort rule optimises the utilisation of the Internet and keeps the network safe (Cave and Mason, 2001).This has allowed a host of innovations and made the Internet a mass individualised communication infrastructure (Graham, 2001). The journey of the Internet from a US military communication system to the

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[56] The end-user connectivity providers generally incur huge upfront cost on infrastructure. However, the incremental cost of carrying data packets is very small.

present state of network of networks is a story of its growing engagement with public by virtue of its openness (Graham, 1999; p-22). The interactive nature of the Internet has enabled the ordinary citizens to influence their social and political circumstances (ibid, 1999; p-37). Even in the early days of the Internet, its interactive nature allowed user-generated contents to become one of its core features (Hine, 2013; p-10).A symbiotic relationship has emerged as the Internet and the users shape each other. This ontological change requires deeper investigation beyond the market behaviour.

The Internet as carriage differs from toll goods like roads on three grounds- (i) physical scarcity determined by spectrum allocation being a policy decision, (ii) peculiarities of what it carries – information and (iii) the existence of cross group and network externalities. Economides (2007) defines network externalities as the phenomenon when "the value of a unit of the good increases with the expected number of units to be sold". In such situations, demand curve shifts upward with increase in the expected sale (p-247).Thus, the idea of price discrimination or paid prioritisation in the Internet market does not sound tenable. In a situation where the consumer has to choose between the connectivity services under paid prioritisation, not only a limitation is imposed on free access to information rather the consumer faces a kind of virtual distance in the online space. A change in relative price brings the cheaper contents nearer in terms of accessibility and makes the dearer content distant from the consumer in the virtual world. A virtual distance can also be created through varying speed of the Internet or complete restrictions on some contents. This virtual distance would again require time and additional cost to be incurred by the consumer to overcome the limitations.

Even with the openness of the Internet being a design priority, it has created considerable space for market for information. On one hand, we buy connectivity services to use the Internet and on the other hand we provide scope for online advertisements when we use search engines or visit websites[57]. Varian (2006) has studied advertisements shown by search engines using two-sided matching models[58]. Search engines not only seek to earn through deviating our attention to advertisements but also use predictive algorithms to restrict our search by giving us predictions. So,

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[57] Except websites of public institutions and government agencies, a good number of websites such as websites of newspapers and social media pages carry online advertisements.
[58] Two sided matching theories are group of theories dealing with one to one, one to many and many to one demand-supply matching. Alvin E.Roth and Llyod Shapely won the Nobel Prize in Economics in 2012 for their work on these theories.

while the Internet has the potential to enhance our access to information, it can also misguide us. Increasing use of online applications such as *whatsapp* and social media for political campaigning is an example of such harmful effects of the Internet[59]. Governments also resort to restrict access to the Internet in times of security concerns. While any kind of restriction to access information, either through limiting use of the Internet or through restrictions on search through it, reduces our choices; any misinformation propagated through the Internet may lead to the problems of adverse selection and moral hazard. These facets of information asymmetry are discussed in the next section.

The Internet acts as carriage of information and provides platforms for a host of applications and websites which represent an entity in the virtual world. Websites inherit the connectivity and access features of the Internet and can also be interactive in nature to the extent desired by the entities they represent. The dynamism added to the representation and accessibility ensured through the Internet, make websites as valuable source of information related to their parent entity. The can utilise updatedness and fineness of information to reach at the visitors. Navigability features such as website search, A to Z link options etcetera are meant to facilitate search and internal linkages of web-pages help in ordering of information. External linkages to other websites signal reputation in the virtual world as popularity does in the real world. As mentioned above, the sources of information or carriage like the Internet draw their importance from what they present or carry, that is, information.

2.8 Availability of Information

In the above sections, different forms of availability of information such as perfect and imperfect information, complete and incomplete information, and information asymmetry have been introduced. Different manifestations of information and their sources have also been discussed. This section would discuss availability of information with respect to choice and decision making in detail. In this context, content of information and structure of availability play important roles (Bettman *et al*, 1991). The content of information refers to what is available or not available as information and how much is available. The structure relates to the organisation of the

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[59] News on use of *whatsapp* for political campaigning by political parties available from- http://www.dailymail.co.uk/indiahome/indianews/article-4384254/BJP-s-uses-social-media-reach-1-6m-Delhi-voters.html retrieved last on 02.02.2018

available content, that is, whether all relevant information is available simultaneously or sequentially and the distribution of information. Thus, from the content side the availability of information can be discussed under two categories information asymmetry and information overload. The structure of availability of information remains crucial for all kinds of contents. The quantity and quality of contents that an information seeker experiences, characterises the situation as information overload or information asymmetry.

2.8.1 Information Overload

Figure-2.1 above illustrated the situation of information overload when information beyond the processing capability increases the uncertainty. The section on uncertainty and information also mentions studies by Malhotra (1982) and Jacoby (1984) on information overload. The popularisation of the term even goes back to 1970[60]. Despite being an old concept, it garnered attention with increasing penetration of ICT enabled communication. It may arise due to situations of quantitative or qualitative overload of information. While quantitative overload is easy to understand due to increasing presence of information around us, qualitative overload may range from lack of time to focus, to multi-tasking, to being overpowered by one kind of information. Moreover, overload might also arise when sources of information are not easily comprehensible to the user. This might happen due to the fact that information from external sources does not mix easily with information generate internally (Macdonald, 1997). Internal sources of information refer to information stored in memory and ongoing search in the larger socio-cultural environment (Bettman et al, 1991). Thus, information overload might be the outcome of excess information emanating from one source or more than one source.

Horrigan (2016) presents a survey of Americans on perceptions towards information overload[61]. People feel overloaded but like the information saturation around them. They feel burdened when they are faced with information demands from them. The results indicate another dimension of information overload occurring due to increasing surveillance mechanism. In India also, there is increasing pressure to enrol

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[60] The credit to popularise the term goes to Alvin Toffler (The Economist, 30th June 2011). The article mentions several nomenclatures for information overload such as data asphyxiation, data smog, cognitive overload and time famine.
Retrieved last from http://www.economist.com/node/18895468 on 02.02.2018
[61] The results of the survey are available from http://www.pewinternet.org/2016/12/07/information-overload/, last retrieved on 02.02.2018

for and link almost all services with unique biometric identification (UID), popularly known as AADHAR.

2.8.2 Information Asymmetry

Above description of information overload links it with uncertainty as a situation of excess of information beyond handling capability. On the contrary, information asymmetry is associated with uncertainty as a situation characterised with lack of information. Different forms of availability of information in economics and in game-theoretic situations have been mentioned in the discussion presented above. Information asymmetry refers to unequal distribution of information between the two parties involved in exchange-the buyer and the seller. Information can only be perfectly distributed when it is revealed to the fullest extent by both the parties- the buyer and the seller. "While there is a single way in which information is perfect, there are an infinite number of ways in which information can be imperfect" (Stiglitz, 2002). Thus asymmetry of information is a feature of market rather than being an exception in reality. "These asymmetries or imperfection of information play a crucial role in determining the shape of market and the ability of private markets to ensure that the economy's scarce resources are used efficiently"(Stiglitz & Walsh, 2005, p14). Akerlof & Shiller (2015) cite instances to illustrate how corporations utilise our limitations to access and process information to fool us. Due to our limited abilities to deal with complexities or situations of uncertainty, we tend to tailor stories and these stories are utilised by corporations against us. While there are many facets of complexities arising out of information asymmetry, some of them widely researched. Some of these facets are-adverse selection, moral hazard, signalling, monitoring costs and principal-agent problem. These facets are discussed in detail here-

Adverse Selection: Adverse selection refers to situations where one side of the market cannot observe the type or quality of the goods on other side of the market. For this reason it is sometimes called a hidden information problem. These problems arise when a party to a transaction has different interests (outside the transaction) and resorts to hide information. If buyers cannot ascertain the competence of the service provider, quality and value of the service, the risks of the malpractices cannot be predicted (Nayyar,1990).Equilibrium in a market involving adverse selection will typically involve too little trade taking place because of the externality between the 'good' and the 'bad' (Varian, 2003). In such a case 'bad-quality providers' can enter

the market and drive out the 'good quality' providers by so lowering the price that the latter cannot obtain economic returns on their competence enhancement (Akerlof,1970). Scorsone and Weiler (2004) have suggested that given the fixed cost of producing information, thin (marginal or small) markets are likely to produce less information than thick (established and large) markets. Thick markets generally have lower average costs of production of information but develop a higher level of accuracy. Thus, the smaller the market, the higher are the chances of existence of information asymmetry. The thin markets are generally prone to the problem of adverse selection as illustrated by Akerlof (1970) himself in the markets for 'lemons', a thin market.

The higher education market is a typical case for adverse selection. In this market, students fail to make out the characteristics of the product to be bought from the institutes. They are hardly provided with information regarding the quality of the product. Even if information is provided, there is no guarantee of the authenticity of the information. As a result, after taking admission, when they are exposed to the true product, they have already been victim of the problem of adverse selection. Information asymmetries (hidden information) may act as a source of profitable diversification if the buyers buy more than one product from the firm. Diversification may also take place in reducing the degrees of information asymmetries existing in the market (Nayyar and Kazanjian, 1983). For instance, engineering colleges nowadays are also offering management courses to be benefited from the existing information asymmetry about the quality of product (education in these cases). Since the students cannot realise the quality of the product in any case (management or engineering), the colleges can offer both to gain from the existing information asymmetry, as offering two courses will signal better quality of products.

As preferences are endogenous, they are guided by beliefs and opinion created over time (Kahneman, 2011; pp-103-104). The changes over time are guided by the kind of information one gathers and processes. Hence, the sources of information and intentions of the information providers become crucial. In situations of information asymmetry characterised with propaganda and agenda-setting, the choices at individual or societal levels may lead to adverse selection. The cognitive capacities of the masses form foundations not only for consumer sovereignty but for democracy at large.

Moral Hazard: Moral Hazard arises when a party to a transaction acts opportunistically to further their own interests in situations of uncertainty and the difficulty of observing and monitoring behaviour relevant to an exchange. This is also known as hidden action problem. Such problems arise when a party to a transaction cannot easily monitor the quality of goods or services they purchase, there is a probability that suppliers may substitute low quality goods for higher quality goods in the form of less effort, creativity, imagination, vigilance or diligence. HE appears susceptible for such situations as students would take very long time to assess the quality of education provided to them.

Characteristics of Moral Hazard

   (i)   Differences in information and uncertainty between the parties of the transaction (information asymmetry)
   (ii)   Misalignment of interests between the parties
   (iii) Difficulty in accurately and operationally measuring and monitoring relevant features of the transaction
   (iv)   Difficulty in enforcing desired contractual performance.

Signalling: The concept of signaling was put forward by Spence (1973). Signaling characterizes the markets where only one side of the market knows the quality of the good that to be sold and the other does not. At equilibrium, both parties participating in the market are aware of the informational consequences of their actions. Who takes the first move is very crucial. When an employer takes initiative in sorting or screening of probable employees, depending on the signals provided by them, it is identified as screening model. When the employees take initiative they provide signals. Thus, the difference between signaling and self-screening models lies in the technicalities of game theory, and in particular whether the informed or uninformed player moves first.

Monitoring costs: Monitoring cost has to be incurred by one side of the market to monitor the actions of the other side of the market in the presence of asymmetric information. Even after incurring monitoring cost, information is difficult to be accessed fully as it is not revealed by the actions all the time. But nevertheless monitoring cost by increasing total cost leads to an inefficient outcome. The costs

incurred to collect information regarding the product to be purchased, increases the total cost of the product for the potential buyer. This increased cost finds no counterpart from the sellers side, thus makes the exchange a sub-optimum one as the market price fails to depict the true cost of the product. The increased cost is due to the increase in the transition costs involved in monitoring.

Murnane (1981) has observed in the education market that if performance were the prime determinant of the compensation of teachers, then it will increase the monitoring costs. He also concludes that the efficiency of a firm depends on the level of transaction costs involved in monitoring. Wholey and Harty (1992) find performance based monitoring to be beneficial for both the monitor and the one to be monitored. He cites an example from South Carolina where performance monitoring of the teachers by the students has improved the school performance on one hand and the achievement of students on the other.

Regulation is a kind of monitoring of compliance with specific norms and involves certain costs. When one side of the market is regulated it entails extra costs to the other side of the market. The regulation by a third party(not involved in the transaction or exchange) can reduce the cost to be incurred by either of the parties involved in the process of exchange on one hand and reduce the element of uncertainty prevailing in the market due to information asymmetry. This provides the ground for regulation of the market by the government.

Principal-Agent problem: An agency relationship arises when one, designated as the agent, acts for, on behalf of, or as a representative for the other, designated the principal, in a particular domain of decision problem. All contractual arrangements, as between employer and employee or the state and the governed, contain important elements of agency (Ross, 1973, p-134).Most analyses of the principal-agent problem assume that the principal chooses an incentive scheme to maximize expected utility subject to the agent's utility being at a stationary point. Such analyses ignore the condition that the agent should be at a global rather than a local maximum. Mirrless (1999) has shown that this procedure is generally invalid unless, at the optimum, the solution to the agent's maximum problem is unique. In the absence of uniqueness, the first-order conditions derived by the above procedure are not even necessary conditions for the optimality of the risk-sharing contract.

2.7 Summary

The chapter highlighted the need for optimum information for choice and decision making. The concept of rationality is reviewed with inputs from psychology and attempts to incorporate the changing notions in economics have been presented. The role of information in choice and decision making is presented with understanding of information as a good along with its nature and value. The understanding of uncertainty and its forms is broadened with help of survey of literature from philosophy, library and information science, psychology and economics. This critical survey helps in negating the inverse relationship between uncertainty and information as assumed in mainstream economics with U-shaped relationship between them. The U-shaped relationship incorporates the existence of information overload and provides essential input to understand bounded rationality. The understanding of information in its various manifestations-data and knowledge is discussed to ascertain the role information plays in choice making and evaluating information as a good. Economic value of information is investigated through critical survey of literature to bring out the public good character of information along with its strategic use. The cost of accessing information is discussed in the light of its economic value and its unique feature of reproducibility. The role of information in different contexts of availability of information is discussed along with their implications for choice making. The importance of sources of information and structure of information availability is discussed. The chapter also brings forth the role of heuristics and institutions in influencing search processes.

Chapter 3

Choice and Decision making in Higher Education

3.1 Introduction

The last chapter dealt with understanding of information and its manifestations along with those of situations characterised with lack of information. Having discussed uncertainty, rationality, choice and decision making in detail, the present discussion would turn to look into these concepts in HE. The understanding of HE as a good and HE market will be presented to be able to discuss of choice and decision making in this market. The chapter is divided into five sections which deal with HE as a good, market and theories.

3.2 Higher Education: The Good and the Market

As discussed earlier, choice is guided by the context of goal and content of list of alternatives and attributes. Thus, understanding choice and decision making in HE requires understanding of HE as a good and features of the HE market. The features of HE as a good and the characteristics of HE market are presented in the sub-sections below-

3.2.1 HE as a Good

HE opens vistas of knowledge and helps oneself able to understand one's worth and find suitable employment. It spurs technological innovations and inventions. An individual after being educated not only gets personal benefits for being more productive; ones' family stands to gain from one's increased income, ones' employer stands to gain from one's enhanced productivity, ones' society stands to gain from one's informed and enhanced participation in societal activities, ones' nation stands to gain from one's active and informed participation in democracy and innovations and inventions one achieves in one's life-time. These societal benefits emanating out from higher education are embedded in the very process and may take longer (sometimes very longer) to be realised by the society at large.

HE as a commodity is different from other commodities bought and sold in market as it has some peculiar features attached with it. These features provide background to understand the market for HE and choices. HE appears to be both

consumption good and an investment good. The investment good character of HE has been more prominent in the mainstream economics. Adam Smith was the first to characterise expenditure on education as investment expenditure by drawing analogies between men and machines which would contribute to the enhancement of skill and productivity of individuals and hence for the economy [62]. He went on to advocate for private provisioning of HE on the basis of its investment good character. The credit for popularisation of this approach goes to Becker (1964) who incorporated education in the sphere of optimising decision making of an individual. His human capital theory claims that expenditure on education (HE in particular) should be classified as an investment at par with physical capital. The investment good approach treats HE as a commodity [63]. When HE becomes a commodity, it ceases to be a means of acquiring knowledge, enlightenment or pleasure rather its imbibing increases access to other commodities. HE as a commodity is not homogeneous- closed object, packaged and compact (Patnaik, 2013). The peculiarities of HE as a commodity are as follows-

a. Experience Good: Quality of HE can be judged only by experience (Teixeria *et al*, 2004). The actual quality of HE is judged gradually after admission. This characteristic of HE leads prospective students to rely on experiences of current students and alumni. Long established reputation signals quality as it is built on the experiences of the previous batches of students. "Reputation is a word which denotes the persistence of quality and commands a price as it economises on search by the consumer" (Stigler, 1961). Prospective students (consumers of HE) tend to rely on reputation of institutions to assess quality before admission. The HEIs utilise this characteristics of HE to attract students through branding. Here, brand is the perception and reputation developed in the minds of the people about the HEI. It is the reaction appearing in the minds of the people on hearing or seeing the name of the HEI or some symbol related to the HEI (Clifton *et al*, 2003). During the branding process, HEIs normally identify and showcase their strengths (Mariotti, 1999; Moore, 2004). This particular character of HE also applies to education at stages below HE.

b. Quasi-public Good: HE differs from other stages of education from the point of view of investment as HE is characterised with simultaneous association with

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[62] The Wealth of Nations, p-
[63] Things become commodity only when salability on the market becomes their sole defining characteristics (Patnaik, 2013).

positive externalities and private returns. This unique feature leads it to be 'Quasi public good' while the stages below HE may be treated as public goods (Niklasson, 1996; Chattopadhyay, 2007). On the basis of private returns being associated with HE, cost-recovery and declining public support to HE is observed. At the same time positive externalities associated with HE asks for public support to HE.

c. Labour-intensive service and Cost Disease: HE like other services is labour intensive by nature and does not conform to capital –labour substitution rather capital and labour appear to be complements for HE for provision of a given quality. The seminal work by Baumol and Bowen (1966) can be considered as the first attempt to understand the rise in cost of HE. Their study was for the labour-intensive services sector in general but it gave rise to debates and studies to understand the cost of HE. Their study propounded that increasing productivity in labour intensive services sectors such as HE is not easy as it is in other sectors by substituting capital by labour while the wages for qualified individuals engaged in such sectors increases along with other sectors. As a result, such sectors experience rise in unit labour costs often more than the overall economy. This phenomenon is known as 'cost disease'.[64] While Cowen (1996) expresses doubts over this phenomenon citing innovation in services delivery can reduce cost; Archibald and Feldman (2006) have found conforming results for this phenomenon from their studies on rising cost of HE.

A first specific attempt to explain the cost of HE was made by Howard Bowen in 1980, known as "revenue theory of costs". He attempted to explain the cost of HE taking into account the peculiarities of the sector. This theory says that a HEI determines its costs considering the revenue constraints. So, to maintain the quality of HE, a HEI has to look for more revenue when faced with rising costs. Considering Cowen's criticism of 'cost disease', Bowen includes cost reducing technological progress which will shift the constraints downwards. The two approaches do not contradict each other over time except for two differences- (i) the latter being specific to HE and (ii) consideration of technological innovations by the latter. But the latter approach (Bowen's) suffers from an inherent contradiction which is the HEIs can either maximise quality or maximise revenue not both of them (Archibald & Feldman, 2007).

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[64] Bela Balassa (1964) and Paul Samuelson (1964) in their parallel studies have come across this phenomenon whose insights can be traced back to the works of David Ricardo in the 19th century.

Another model came from Massy in 1989 known as "autonomous cost increase model" with an implicit assumption that every university is a separate monopoly facing an inelastic demand and can raise prices at will. Massy's analysis is found lacking the explanations for very slow increase in prices, revenues and expenditures for a monopoly HEI in general and sudden changes in these variables in particular. John Siegfried and Malcolm Getz (1991) also attempted to find explanations for rising cost of HE also considering the peculiarities of the sector. They gave six plausible explanations one of which is the phenomenon of cost disease. The other explanations for cost increase are- (i) change in the product mix in favour of more expensive disciplines, (ii) shortages of HE specific inputs, (iii) inflated desires for quality, (iv) poor management, and (v) government regulations. While the factors such as inflated desires for quality and government regulations seem to ignore the *publicness* associated with HE, the other explanations are general for any commodity. Thus, Siegfried and Getz appear to be not fulfilling their claim for considering HE with its peculiarities. The literature on HE financing is filled with studies treating HE as any other sector without considering the specific needs and peculiarities of the HE sectors to understand the cost from supply side, which is very much linked to profiteering in HE.

d. Absence of production function: Unlike other goods, the production function is not clearly defined in the case of HE, as it lacks clear input-output relationships (Majumdar, 1983). The inputs here, the students, are the output themselves. In such a situation HEIs owe their reputation to the inputs whom they charge for education. The role of students is not limited to being input or output rather they contribute to the production of HE. While the role of consumer is important in production of any service as a service is produced during consumption, it becomes more prominent in HE where the students are inputs, co-producer and output as well (Kotze & du Plessis, 2003). Such unique association of inputs with output cannot be represented with production functions rather can be understood from a broader perspective of HEIs being a cooperative enterprise (McCulloch, 2009). While consideration of HE to be a consumption or investment good makes student a mere receiver, the roles of students as co-producers establish them to be active agents in the process of HE.

3.2.2 HE Market

As discussed, one of the outputs of HE, the students-optimising decision making units are also the inputs for HEIs (Majumdar, 1983; Winston, 1999). With such peculiarities of HE as a commodity, the market for HE is also unique. HEIs act as multi-product firms with degrees, passing out students and research and innovation carried out by them as output. The market consisting of such firms with heterogeneous outputs has the following features-

      a. Quasi-market: The market for HE, a quasi public good, is a Quasi- market (Niklasson, 1996; Bridges & Jonathan, 2003). The term 'Quasi-Market' was coined to denote the organisation of services on the lines of market principles as observed in the case of HE (Le Grand & Bartlett, 1993). This feature renders itself to policy interventions quite obviously as it is a policy determined feature itself.

      b. Customer-Input Technology: The HEIs, above the average level, seek to create a peer group which matches the quality of the institutions. This creates a unique academic ambience in which the peer teaches the peer. Peer quality acts as an input to a HEIs production in technical terms and it cannot be bought from anyone other than its own customers (students). HEIs may have to incur cost for this input in the form of advertisement, fee-waivers and scholarships. This input may or may not have substitutes. Its use may get adjusted to reflect its costs, available substitutes and resources (Winston, 1999, Rothschild & White, 1995). Thus, the market is characterised with customer- input technology (Texeira *et al*, 2004).

      c. Positional and Hierarchical: HEIs are hierarchical and positional in nature. It starts with their unequal access to resources during the formative years, then gets amplified by their reputation built upon product quality over the years and persists in competition in terms of heterogeneous goods and services and their prices (ibid, 1999; 1995). The monopolistic competition among them also emanates from their geographical location and institutional characteristics-objectives and the process of institutionalisation of information systems.

      The characterisation of HE sector as market is not free from debates (Dirks, 1998; Bok, 2003). One of these arguments, for example, is over whether or not students could be considered as customers or consumers in the first place (Sharrock, 2000, p-22). This opinion is supported by the idea that education is not to be marketed as this would create major social and economic problems. Attitudes opposing

marketing education believe that it is not suitable to talk about this subject and it is even 'shameful' to call students 'customers' (Holbrook, 2005, p-144). Others believe that the introduction of market forces into the area of education evokes feelings of concern, even mistrust, within the world of education (Gibbs & Knapp, 2002). While these concerns arise out of consideration of social and ethical perspectives towards HE, even the literature on marketing on services accepts the contribution of customers in the production of services. This contribution as co-producers becomes more profound in HE, as explained above, due to students being crucial input for HE. Moreover, HE is a life transforming process for the student in terms of values, skills, perspectives etcetera (Teixeria *et al*, 2004). The student earns from the skills learnt, the values inculcated in him/her foster the sense of citizenship and the change in the perspectives and persona would be enjoyed throughout the life. Education has been recognised as a tool for socialisation and HE is the ultimate stage of the process. It is an activity, on behalf of the society, in which both students and teachers engage to transform life (for students) and society (Patnaik, 2007).

Despite theoretical debates over characterisation of HE as market, there have been efforts to encourage marketisation in HE not only with creating space for private providers but also by introducing privatisation or partial privatisation in publicly funded HEIs. The debate whether the entire expenditure on education could be treated as investment expenditure or consumption expenditure seems to be settled in favour of investment approach. In publicly funded HEIs, privatization or marketisation is evident in the forms of partial privatisation through fee-hikes and student-loans, and cross-subsidisation of courses. The partial privatisation of HE by hikes in students' fees, students-loans and other related mechanisms aim at balancing the responsiveness to demand for and supply of HE. Cross-subsidisation of courses by selling the most demanded and subsidising the less demanded is also becoming popular among HEIs (GoI, 2005).[65]Such cross-subsidisation of courses in a way can be seen as bundling of services to students as observed in case of other services (Becker & Round, 2009). Own resource generation by the hitherto publicly funded universities and the emergence of private HEIs has led to the growth of self-financing courses in these institutions. Such courses are mostly of professional and technical in nature, having better job prospects. The market for HE thus expanded, dwells on fees

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[65] CABE Committee Report, 2005

paid by the students. Thus, attracting students has become one of the objectives of the HEIs in the wake of increasing privatisation of HE. All sorts of measures and efforts from advertising to employing agents are attempted to attract students.

3.2.3 The S-competition in HE

While profit motives might encourage the HEIs to attract more number of students who can pay, striving for excellence drives the HEIs to maintain their hierarchy by appointing faculty of certain quality and admitting students of their standard. Such selection bias has been observed in health care market (Akerlof, 1970) but their existence in education market in general and HE in particular is perpetuated by peer effect (Glennerster, 1991; Winston, 1999). In HE, both parties-students and institutions choose each other. They choose each other by acquiring information regarding each other. The consequent process depends on the choices and decisions taken by both the parties." This striving for academic excellence is relative to other HEIs, that is, the goal has a positional aspect. HE as a positional good can be defined as " a good, valuable to some people only on condition that others do not have it" (Hollis, 1987)[66]. Thus, HE, a heterogeneous good is delivered by the HEIs placed differently in the strongly hierarchical market. The HEIs are differentiated initially by their access to resources-physical and human resources-faculty recruited initially. "This hierarchy is then amplified by the feedback from those resources to institutional quality to student quality to demand to selectivity to greater student quality" (Winston, 1999). In HE, the management of Institutions (placed near or above average quality) are motivated by "the pursuit of excellence"(Clotfelter, 1996).The HEIs compete with each other to attract the best available faculty and the best available students which in turn attract the best of the lot gradually. At the same time, they exercise control over whom they sell to by generating excess demand and then selecting the students with the characteristics they most desire from the resulting queue (Klitgaard, 1985; Rosovsky, 1990; Litten, 1991; Duffy & Goldberg, 1998; Bowen & Bok, 1998). The quality of students so chosen helps to attract students with same characteristics. Epple *et al* (1999) and Epple *et al* (2001) attempted a model to predict pricing behaviour of HEIs, considering students differentiated by both ability and household income and focused on the implications of quality maximisation. At market equilibrium, household tend to maximise their alternative utilities with given

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[66] As quoted in Merril (2010).

qualities of HE, fee-structure and admission policies. Effective marginal cost (EMC) of admitting a student of certain ability is the sum of the marginal resource cost of educating the student and the cost of maintaining quality due to the impact of students with different abilities on peer group. The HEIs, at the same time, tend to maximise quality of HE by choosing fee and admission policies. The households choose among the affordable HEIs or no HEI.

As Majumdar (1983) puts it, "The process of education depends on investments made in two complementary parts and decided in two domains-individual and institutional"[67]. Here, both the parties choose each other. Through the process of mutual selection, the HEIs try to maintain their reputation and students look forward to the reputation of the HEIs to economise on cost of information search as reputation denotes the persistence of quality and commands a price as it economises on search by the consumer in the market (Stigler, 1961). These processes lead HEIs to compete in terms of heterogeneous goods and services and their price. The cost of production of these heterogeneous products and their quality is not easily observable. The information regarding these remains hidden. As the information is available with HEIs only, they can vary cost-structure to maintain profits and hence vary the quality, sometimes compromising with the basic minimum. The variation can be sometimes huge variation in price due to coverage of fixed costs incurred from one batch of students to create infrastructure for future batches. With cost and quality, price is also varied to attract students. Variation in price signals variation in quality. Sometimes price is hiked to signal up-gradation of quality. In HE market, the (other) input specifications are advertised to a crucial input (students) unlike the case of other goods whose product specifications are advertised.

3.3 Choice and Decision making in Higher Education

The discussion above highlights how HEIs choose students depending on their motives and how mutual choice by students and HEIs is important for HE. Majumdar (1983) suggests that under the individual domain students invest their resources and time and choose the institution to maximise the expected rate of return. Under the institutional domain, institutions select students and faculty on the basis of calibre and merit to sustain a standard peer group and maintain their reputation. Prospective

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[67] HE can be viewed as an investment good although it yields satisfaction beyond the returns from investment. The debate is discussed in the next section.

students and faculty choose reputed institutions as reputation signals prevalence of certain quality to them. Majumdar (1983) also opines that parents take decision on behalf of the students in the context of school education while in higher education students may independently take decision but parents may still influence their choices. Parents with better quality education may affect their children's choices more effectively and the impact changes dramatically as parental education changes by each level (Basant & Sen, 2012).

As seats are limited for admission, students have to search information on reputation of institutions to ascertain the quality of the educational services provided, details to ensure the cost structure and other relevant pieces of information. The efficiency of choices made by the students depends on the perfection of information available to them. Ignorance on the part of consumers and cost of collection of information and changing service provider mid-way (sunk cost) provide motivation for a service provider of HE to defraud a customer (Darby & Karni, 1973). Students studying professional courses do track campus placement history and are helped by their HEIs in placements but no HEI generally guarantees job after completion of the course. The insurance kind of structure available for other services like repairing automobiles is not available for students in HE.

Under imperfection of information or information asymmetry, the students are concerned with the probability distribution of the getting different options. Here, a probability distribution consists of a list of different options available to them and the probability associated with them. In such situations, a student is bound to have contingent admission plans implying preferences over different plans of admissions. Thus, the student has to optimise expected utility instead of utility under the conditions of information asymmetry. It is to be noted that expenditure on HE is a combination of consumption and investment, depending upon the context specific and individual specific rationality. It changes gradually as more and more information is acquired by the optimising agent. The content and nature of information acquired affects the preferences from exogenous to endogenous. Preferences which are assumed to be exogenous in the demand theory are actually in practice largely endogenous (Hogan, 1997). Gilead (2012) provides a review of literature related to nature of preferences being exogenous (stable and given) and endogenous along with their association with economic policy making in education. The endogenous nature of preferences emanates from context of choice and decision making in education in

general and HE in particular (ibid, 1997; Bharte, 2014). The next sub-section presents a brief description of such context and determinants of choice in HE.

3.3.1 Determinants of Choice

The factors driving choice by HEIs has been discussed under two approaches- profit seeking and quality maximising. As the choices made in two domains- HEIs and students, it is imperative to understand the choice of students. The attempts to understand choice for HE can be categorised into two approaches- rate of return approach and human capital approach. While both the approaches treat HE as investment good, as discussed above, their treatment of returns differ. The rate of return approach focuses on private costs of accessing HE and private returns which individuals expect from their investment. The human capital framework developed after pioneering works by Schultz (1961) and Backer (1964) revolutionised the economic understanding of education. Becker (1964) focussed on informational content of human capital, as discussed in the last chapter, and provided a detailed understanding of determinants of investment in human capital. The detailed discussion on merit of students, relative position in society and their family background as important variables influencing investment in human capital guided future studies in the area of choice and decision making in HE.

Studies on choice and decision making in HE reveal a range of determinants to understand the context of choice making and content of the processes involved. Swell and Shah (1978) brought forth the importance of social background and academic performance of students in their choice making. While Psachropoulos & Soumelis (1979) stressed on ability of students Chapman (1981) highlighted college characteristics and efforts along with the background and individual characteristics of students. The fixed characteristics of the institutions and the institution's own efforts to communicate with prospective students were found to be important for students. He concluded that both the student's characteristics and external influences contribute to, and in turn are shaped by student's generalised expectations of college life. Jimmenze *et al* (2000) found the results similar to Swell and Shah (1978), and Psachropoulos & Soumelis (1979). The variables found to be influencing choice were academic aptitude, social background of students and their family income. Menon (1998) also tried to shed light on the various factors that affect the demand for higher education in Cyprus. She stressed on the roles of psychological or individual factors in addition to

economic and social factors considered to be of importance as determinants of choice of higher education. The most commonly investigated psychological variable is that of student ability. Robbins *et al* (2004) brought forth the importance of social involvement of students along with their background as important variables to understand educational choice. Vrontis *et al* (2007) tried to bring together the existing higher education student-choice models in order to extract the important parameters, and to construct a generic model of higher education customer behaviour.

The studies discussed above focus on characteristics of students mostly and very few of them consider institutional characteristics. Hossler and Litten (1993) found that there were independent sources of verification of information provided by the HEIs. Carrico *et al* (1997), Connor *et al* (1999), and Moogan, *et al* (1999) worked on information and choice and found that availability of information influences choices of students in the UK. Kane (1999, 2002) brought the importance of institutional characteristics and information regarding them as important variables influencing choice of students. Hoxby (2003) found lack of information related to institutions as factor behind poor college going rate in the US. Dill and Soo (2004) found lack of information as important variable affecting quality of HE.

In India, there are very few studies on choice and decision making in HE. Access to HE has attracted the attention of Indian scholars more than choice and decision making. However, the studies on access to HE establish the roles of socio-economic background such as gender, family income, membership of social and religious groups as important variables determining access to HE. Khan (2015) presents a critical review of literature available on access to HE and evaluates the relative roles of social and religious categories on access. Bharte (2009) tried to understand choice of HE over employment and found the roles of self-efficacy of students along with their background as guiding their choices. Pathak (2008) worked on existence of information asymmetry in engineering education market and found the roles of educated family members and people known at prospective HEIs as important sources of information. Studies by Mitra (2011, 2012, 2013), Pramanik (2011) and Halder (2011) were focussed on different aspects of information asymmetry. While Mitra (2011) found moral hazard and signalling to be operational in technical educational, Pramanik (2011) and Halder (2011) found the role of gender as one of factors influencing information asymmetry among students. A study by Dastidar and Sikdar (2015) tried to understand occupational choices of students after

HE and evaluated their awareness and sources of information. Nandi (2017) surveyed students of engineering and found selection competition to be working in technical education with respect to choice of students and institutional aspirations. She also found background of students, their aspirations and merit to be influencing their choices. While there are very few studies on choice and decision making in HE, most of them focus on existence of information asymmetry. There appears a wide gap in literature with respect to understanding choice and decision making with respect to information needs and search by students.

3.4 HEIs processing Information

Information processing can be seen as a part of the institutionalisation of information systems. The HEIs from their inception tend to institutionalise a particular kind of thought pattern. The process of institutionalisation of information systems or particularly the information processing develops through the aggregation of individual choice orderings, the millions of decisions to trade-off one desire, goal or need for one another (Arrow, 1963). The HEIs in delivering their services convey the particular orderings of thoughts and theories to develop basis for a particular ideology and thought-pattern. Thus, even at the top the HEIs differ in terms of the information content of their services. The quality of goods and services tend to exchange in proportion to their information content. With increasing complexity of the good, it would seem to require a commensurate need for diversity and higher quality of information in its production (Hayek, 1967).

Loomis & Rodriguez (2009) stipulate that the education good requires for its development a human scale at each level of higher learning and a dynamic mix of particular and universal information represents the complexity. The process of information processing is embedded in the very process of delivery of education as a service. Information processing is not the activity rather an embedded process of HE.

HEIs use newspapers, broachers, prospectus and websites as mediums for furnishing or providing information. Among them sources, websites can overcome the constraints of time and space. HEIs can just not only provide detailed information but can arrange information as per their convenience. These websites can be visited by the information seekers at any suitable time from any part of the world to collect information. The degree of smoothness of collection of information depends on the design and structure of the websites. The reliability of the information depends on the

mode of expression and frequency of the updating of information. The structure, design and frequency of the updation can be taken to be representing the thought-pattern or information processing by the HEIs. These representations being different from one another can lead to different information processing by the information seeker also. Thus, websites of HEIs available through internet are important sources of information processing.

3.4.1 Higher Education and Internet

To attract students for the purposes of cost-recovery, profit or maintaining standard requires the students to choose the institution. The students can choose any institution on the basis of information available to them from various sources. Senior students of the prospective institutions, teachers and senior friends of the present institutions, family members and Internet have been the trusted sources of information for students (Pathak, 2008). The prospective students seek to find information to ascertain the level or relative ranking of the HEIs. They usually get signals to ascertain the hierarchy of the institutions. The top quality institutions are few and easily recognisable on the basis of their established reputation. The institutions lying near to average in hierarchy are relatively difficult to be ascertained with their quality. The prospective students and faculty to be able to make efficient choices need to gather information relating to HEIs in their reach in terms of their paying capability and capability to pass entrance test, if required.

The credibility of elite institutions that have been long established is evident from signals such as faculty publication, alumni reputation in the job market etcetera. In the case of private and newly established HEIs the signals are generally weak or absent. The information processed by the HEIs to the students and faculty signal the quality of education, the nature and degree of strength of governance structure, the quality of the peer group and other related attributes of the institutions. The relationship between information processing and the signals or attributes of the HEIs is two-way. The information processing by the HEIs reflect the signals or attributes on one hand and the attributes like quality, reputation, and governance etcetera determine the nature and scale of information processing by the HEIs. The prospective students or faculty process such signals and make their choices accordingly. There are various media of information processing by all concerned parties such as newspapers, internet, and broachers etcetera. .Among these media, internet and broachers have the

scope for detailed information processing. As the brochures are not easily available to all prospective students and faculty, Internet is acting as most effective media. This study seeks to look into the information processing through Internet, that is, websites of the HEIs and related dynamics of choice(s) and decision (s). The study seeks to capture the requirement of information on the part of the students and faculty while processing information from the HEIs and the intention(s), purpose(s) and objective(s) of the HEIs in processing information and thus capturing the general picture of HE in the light of flow of information. The study tries to look at the flow of information from the HEIs to students and faculty (prospective) and processing of information by all the parties concerned.

3.4.2 Students and Internet

Agosto (2002a) developed a model for web site evaluation based on her qualitative study involving 11 female school going students. Rieh & Hilligoss (2008) have identified relationship between credibility judgments, embedded in the process of information seeking, and information seeking strategies of college students through looking at their choices and decision making. They found that long term and personal goals are directly related to credibility concerns. These concerns are relative to the context of goals pursued. The authors postulate that credibility judgments are themselves process and are not done at one point in time. People tend to make two kinds of judgments on the Web: predictive judgments and evaluative judgments (Reih, 2002). When people access certain information resources, they make predictions to reflect what they can expect, known as predictive judgments. Evaluative judgments are made to reflect values and preferences when some information is already encountered by the information seeker. Reih & Holligoss (2008) add a third kind of judgment to the list-verification which is done at a later point when some contradictory information is encountered or when the information obtained is actually used.

According to Flanagin & Metzer (2008) the indicator of credible web based information is information itself. Various features such as organisation of information, content, type, presentation, layout, navigability, functionality, readability etc add credibility to the information. The source and reputation of the source also plays their roles in establishing credibility. Reih's (2002) academic participants were more interested in source and reputation than in graphics and presentation.

Search engines also play important roles. They have different methods of operations based on different syntax, semantics and languages.

Web resources are diverse, networked, heterogeneous, dynamic and available in vast array of digital data formats such as text, hypertext, image, sound, video, animation etc. Information collection from web resources is a dynamic process and beyond physical boundaries.

3.4.3 Research on Websites of Universities

Parker (1997), the then webmaster of Vanderbilt University, put forward experiences of developing website for the university. He suggested a 'partnering approach' in which each unit of the university would provide updates and contents and a team at the level of university would provide necessary expertise. The decentralized team work idea for designing and maintaining university websites was meant to complement the dynamism of websites against the slow changing nature of universities as organisations. Corry *et al* (1997) also shared their experiences of developing website for Indiana University and suggested user-centred design and usability testing for a university website. They also recognised internal and external users as different set of users while comparing the existing and proposed websites

Middleton *et al* (1999) presented ideas and guidelines on how to put together a university website. They suggested navigability-search options on websites, accessibility-easy availability and currency of information to be given priorities. While information relevant to external users should be navigable, accessible and updated; privacy and confidentiality of information or tools relevant for internal users should also be maintained. Their guidelines or suggestions have been taken as scales in some of the studies. According to them, the internal users-current students, faculty and staff find the features-telephone directory, library catalogues, news, internal social groups and timetable useful while external users-prospective students, faculty and staff find courses being offered, prospectus, local city information, mission statement, university contact, job openings, support and pay offered to staff and faculty, faculty research etcetera to be useful.

Most of the studies on university websites have been design or computational centric studies focusing on either information architecture like the study by Gullikson *et al* (1999) on information organisation. These studies attempted to find the impact of university websites on enhancing the experience of visitors on university websites.

Kenneth Green has been tracking the implementation of various uses of Information Technology from use of hardware such as CD-ROM to mobile apps by colleges and universities in US since 1990 under his annual Campus Computing Project. Green's studies from 2002 to 2006 under the project has been focused on tracking the implementation of a number of online services (online course registration, course management software, online applications for admission, library catalogues, campus portals etc) as well as the institutional home pages. These studies are based on surveys of IT officials and administrators of HEIs in the USA. Hence, these studies do not analyse the effectiveness of websites from users' perspectives.

Callahan (2005) and Rajkumar (2003) found cultural differences in university websites from different countries. As discussed earlier, different intuitional tradition develop different information processing methods or intuitional rules. Such differences have also been observed by Callahan (2005) and Rajkumar (2003) . Callahan & Herring (2012) analysed webistes of 1140 universities from 57 countries to trace their uses of languages and found multilingualism growing on websites of universities. There are some studies which have examined the usability of university websites for different categories of visitors. The study by Coombs (2002) has examined the usability of websites for differentially abled. Such studies are not related to this proposed study.

The credit to make an attempt to evaluate websites of universities from users' perspective goes to St. Sauver (2003, 2004) who studied 172 American university websites in 2003. He looked into technical issues- design and development of web services and the use of websites to inform the University of Oregon for the same purposes. He found that the home pages are segmented according to audience and intended to facilitate them.

Gordon and Berhow (2008) conducted a quantitative content analysis of 232 websites of American universities to explore the interactive potential of university websites. Their study incorporated the strategic framework to enhance dialogic public relationship through websites, developed by Kent and Taylor (1998, 2002). The study found institutional differences in the presence of dialogic features on websites and positive correlation between such presence and student retention rates. Eduventures (2007) surveyed 500 students to find the specific pieces of information that the students expect from the websites of universities. The information on costs of education was most sought for. Kothainayaki *et al* (2012) surveyed 76 research

students pursuing their research from engineering institutions in and around Chennai, a metropolitan city in India, to understand views of students on features of websites, experiences of accessing websites and factors determining access. They found that students prefer .edu and .ac.in domains more than .com or .org domains. They utilised chi-square tests to rank responses and finding determinants. The study suffers from conceptual and methodological problems. Mateos *et al* (2001) analysed the types of information available on Spanish university websites using a Web Assessment Index (WAI) created by them. The WAI uses the number of external links on the Web pointing to the website analysed as one of the measures of link popularity (indicating website accessibility).

Meyer (2008) developed a methodology to evaluate home pages of universities. The study investigated the use of home pages by 40 American HEIs to find their performance and to portray the general picture of HE as reflected by the websites. Chadha (2008) studied the websites of 118 of Indian universities to investigate the purpose of using different contents or features in websites to cater to different users.

Jeyshankar & Babu (2009) studied websites of 45 universities from Tamil Nadu, a state in India, utilising webometrics and measured their Web Impact Factor (WIF) through altavista search engine. They stressed on classification of universities by domain name and suggested that the university websites should have large database. Such studies are useful in assessing network characteristics of websites from the Library and Information sciences perspective. Lewis *et al* (2007) worked on a student web accessibility project and developed matrices for disable-friendly test for university websites. Nwagwu & Agarin (2008), who in their study of websites of 30 Nigerian universities found newer universities to be having more links by target web-pages comparatively, they found overall underutilisation of websites for information dissemination.

Yolcu (2011) compared ten most visited university websites of Turkey with ten most visited university websites globally based on Webometrics Rankings of World Universities. The study, based on content analysis, found Turkish university websites to be lacking in utilisation of websites as public relations tool and the top ten global university websites were found to be utilising their homepages effectively to promote their quality and distinction as academic institution. Meyer and Jones (2011) present a good review of research on websites of university by the scholars of Library

and Information Sciences. Their review mentions effectiveness as one of the important criterion for web quality. Here, effectiveness is understood as "the capability to enable users to achieve specified goals with accuracy and completeness".

3.4.4 Gaps in literature

The studies discussed above touched upon important aspects related to university websites but a holistic understanding of websites as virtual representation of the university is missing. It seems that these studies assume same kind of motives for universities as far as information processing through their websites is concerned. The mode of financing of universities and governance structure may lead to differences in motives and hence in information processing through websites. Moreover, the studies lack economic perspectives as most of them are done by scholars from Library and Information Science, Engineering, Psychology and Education background. This study tries to bring in economic perspectives by using theoretical underpinnings from economics of information. Also no study has yet considered the role played by relevant policy in influencing information processing through the websites of universities. This study seeks to develop on the study by Pathak (2013) with a reasonable sample-size and to go deeper into the differences and seeks to look beyond the contents to find out the causal relationships between what is shown and the way of the exhibits are presented.

3.4.5 Indian HEIs

HEIs tend to attract students and faculty to maintain their standard of quality, even if they do not follow the principles of privatisation or marketisation of HE. Attracting quality students and faculty has been the concern for universities to preserve their quality and reputation. Indian universities have traditionally been facing this challenge. Indian HE sector is characterised with few pockets of excellence and a large number of average and mediocre institutions (Kapur and Mehta, 2004). "Indian HE seems like an enigma enveloped in contradiction. Pockets of excellent teaching and research institutions are surrounded by a sea of substandard institutions"(Altbach, 1993). While a few excellent institutions are producing best graduates capable of competing anywhere in the world job market, a host of substandard HEIs are leaving their graduates helpless in the job-market. This enigma is also evident from the fact that some top quality institutions like IITs are finding it difficult to find faculty.

This study recognises the policies relevant to information processing by universities and seeks to analyse the process from economic perspectives. Literature discussed above provides bases for the study. Moreover, the study takes into consideration the relevant policies, guidelines or laws governing information processing by HEIs and particularly through their websites. Such policies, guidelines or laws are discussed above. Apart from these policy initiatives, two instances form the basis for this study. The first instance is the judgment of the Honourable Supreme Court of India in a case related to teachers' training college in Madhya Pradesh[68]. The Court opined that adult students are responsible for their choices and verification of information related to their choices. While the college was held responsible for not disclosing information related to their affiliation and recognition, the students were denied mercy for their degrees to be recognised. The second instance is the growing number of HEIs in India. With such large number of HEIs, their websites seem to be better sources of information as collection of information from other sources becomes cumbersome for information seekers.

3.5 Summary

The literature related to choice and decision making in HE has dealt with factors influencing choices and traced the importance of information needs but the process of seeking these needs are not studied. The unique features of HE are juxtaposed with choice and decision goals of students and institutions. The literature available on websites of HEIs as a source of information is critically evaluated to bring forth the gaps in available literature. The literature has not yet been able to reconcile the elements of accessibility of information on web-pages, number of clicks, position on folds of web-pages and number of folds. The literature also seems to be considering same motives for all HEIs despite differences in their financing. The literature also does not cover websites as holistic representation of HEIs in virtual world. The review also identified variables influencing choices by students with respect to information processing by them. The chapter establishes the need for two surveys- website survey of HEIs and questionnaire survey of students.

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[68] Reported in The Financial Times, 04 Nov 2012

Chapter 4

Research Methodology

4.1 Introductions

The preceding chapters dealt with the role and importance of information in general and information seeking behaviour of students in particular. The review of literature on information and choice, information seeking behaviour of students and information processing by the HEIs particularly through their websites presented the conceptualization of information and methodologies employed by existing studies along with the gaps in literature. This study attempts to address the gaps and approaches the information processing and choice making in a comprehensive manner. This chapter describes the genesis of the research problem, development of survey instruments, process of data collection and plan for data analysis.

4.2 Situating the Research Problem in Paradigms

In a country with the second largest HE system of the world and with a population of 157 million of people within 18-23 years of age, understanding choice and decision making in HE appears very important. This socio-economic reality is complicated by the overwhelming presence of information enabled by the developments in the ICT and policies targeting transparency, accountability and surveillance. The understanding of information processing with its constituent processes-search, collection, assembling, prioritising, analysing and use; the process of choice and decision making in HE can be understood with respect to a source of information that can connect the HEIs (the suppliers of services) and the buyers (students). A wholesome source available round the clock with its dynamism is websites of HEIs. With this objective, this research intended to study the websites of HEIs as source of information processing by the HEIs and for the students. As the websites have been studied from the perspectives of students, it was felt necessary to understand information processing experiences of students to triangulate findings from both the sides.

O'Leary[69] (2004, p-85) suggests to initiate formulation of methodology as a particular paradigmatic set so as to be able to develop a framework. Any particular paradigmatic set requires going through ontological assumptions at first (Burrell & Morgan, 1979). The above conceptualisation can be situated in terms of its ontological considerations in the following sub-section.

4.2.1 Ontological considerations

The two distinct ontological paradigms- realism and nominalism stand opposed to each other. While, individual consciousness and cognition is at the root of social reality for the nominalists, the realists situate the social reality as external to individual (Cohen *et al*, 2007; p-9). When one seeks to investigate existence of trends or patterns and their kinds, if they exist; the social reality is situated external to individual. However, theoretical debates over conception of rationality, as discussed in previous chapters, bring out the importance of cognition and consciousness in information processing. Thus, theoretically this research accepts the role of consciousness and cognition but is interested in investigating existing of trends or patterns of roles played by cognition and consciousness of students as information seekers. Even in studying websites of HEIs, the indicator developed to measure visibility of links on web-pages, utilises assumptions related to consciousness of visitors of websites and relative positioning of contents. The research seeks to understand trends and patterns as universal over inherent dynamism of the processes, with the realisation that these are products of consciousness and cognition. So, the research can be situated in the realist paradigm but with no opposition to the existence of the essence of nominalism.

4.2.2 Epistemological considerations

As ontological assumptions lead the research to epistemological assumptions, the research can be situated in the positivist paradigm (Hitchcock & Hughes, 1995; ibid, 2007). However, the positivism applied in this research is not of the kind that Sjoberg and Nett (1992) considers as mechanistic view of social order seeking absolute and objective knowledge. Rather, the research seeks to uncover the truth in a possible and probabilistic way following the post-positivist paradigm (Baronov, 2004). Due care

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[69] As quoted in Sjoberg & Nett (2009).

has been undertaken during the collection of data to reach at better and untainted probabilities to be near the truth.

4.2.3 Considerations related to Human nature

The two paradigms have their distinct assumptions related to human nature. The realist or the positivists assume a rationalist construction to explain the human behaviour while the nominalists or the idealist utilise a set of meanings used by individuals to interpret. This research located in the post-positivist tradition considers the theoretical premise of endogenous preferences, and is interested in unravelling trends and patterns of meanings that emerge out of perceptions of students. Thus, the research assume deterministic relationship between the individuals and their environments as the individuals are assumed to be guided by same kinds of norms and motivated by patterns of pursuits to study. While the perceptions of the students are assumed to vary depending upon set of meaning they utilise, there is possibility of pattern or trend emerging from these variations. That is, the human nature is assumed to be rational with broadened conceptions of bounded rationality

4.2.4 Methodological considerations

Based on the three considerations explained above, the research can be situated in the realist paradigm with due considerations of nominalism; post-positivist and deterministic with a focus to understand individual experiences. The research thus utilises mixed method to trace trends and patterns, and variations in them arising out of qualitative differences. Apart from the reasons explained above, the need for triangulation has also driven the choice for mixed method. The data available from websites of HEIs are qualitative in nature as they consists of contents (available or not available), reachable with the help of certain number of clicks (of mouse) if available, and located at certain places on web-pages. The other study has been focussed on experiences of students before and after admission. Such perceptions are in qualitative form. These two qualitative data sets can be better triangulated if certain patterns can be traced out of them. Also, the role played by external factors such as mode of financing of HEIs and social background of students can be better triangulated in the two data-sets with the help of patterns and trends. Thus, there are proper justifications for adopting mixed method as suggested to be required by Sale *et al* (2002).

The research uses quantitative, qualitative and quantified qualitative data. The three kinds of data are collected simultaneously. So, the approach to mixed method is concurrent at the level of collection of data. At the level of analysis, the quantified qualitative data are together while the qualitative data (content) analysis follows.

4.3 Research Design

This study seeks to understand information processing, decision making and choices in HE as a process of information flow from HEIs through their websites and information processing by students from various sources with a focus on websites of HEIs. The study seeks to unravel patterns in the processes involved and also to bring out specificities, as observed. To unravel the patterns, the study utilises quantitative tools and to complement the patterns with specificities, the study uses qualitative tools. To understand the information processing from HEIs, a detailed study of websites of randomly selected HEIs has been conducted. To study the information processing by students, an online questionnaire was circulated among students and their responses have been collected.

4.4 Sampling for the two studies

4.4.1 Population:

Websites of HEIs

The population for the study of websites of HEIs, comprises of the Higher Education Institutions (HEIs) awarding degrees through traditional classroom instructions method. Here, degrees refer to graduation, post-graduation and research courses and do not include diploma of any short. This study does not consider open universities as they follow different pedagogy and are very small in number to be considered as a category[70]. HEIs in India can be categorized in three groups on the basis of financing-central, state and private. Centrally funded HEIs comprise of central universities, institution of national importance and deemed to be universities funded by different ministries of the Union government. State HEIs refer to universities and deemed to be universities financed by the State governments. Private HEIs are the ones which are managed and financed by private organisations and generally claim to be not for profit.

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[70] There are 21 Open Universities- 1 Central, 18 State and 2 Private. Apart from them other HEIs also provide distance education.

Institutes of National Importance are premier educational institutes which are autonomous and funded directly by the Union government. Central and State universities are established and funded by the Union and State governments respectively. The Union government finances the Central universities fully and some State universities to some extent through the University Grants Commission (UGC). The Deemed universities are declared so by the Union government on the recommendation of the UGC. Some of the Deemed universities are private and some are funded by the government or government agencies at both levels-Union and State. The system of open and distance education also exists in India comprising of the three types of universities. Some of the Institutions of former categories also offer open and distance education.

A list of HEIs, 669 in number, was compiled from the websites of UGC and Ministry of Human Resource Development (MHRD)[71]. The URLs for HEIs were retrieved from these two websites and the website of All India Council for Technical Education72. In case, the URL for any HEI was not mentioned on these websites or was found not working, a web search was conducted to find it.

Profile of HEIs

Table-4A, presented below, shows the regional distribution of HEIs in India. The Northern region, comprising of Haryana, Punjab, Delhi, Uttar Pradesh, Himachal Pradesh, Jammu and Kashmir, Uttarakhand, and Chandigarh, has the most number of HEIs preceded by the Western region which includes Madhya Pradesh, Maharashtra, Goa, Gujarat and Rajasthan. The Southern region consisting of Karnataka, Telengana, Andhra Pradesh, Kerala and Tamil Nadu has the most number of State HEIs. The Eastern region which includes Bihar, Jharkhand, Odisha, West Bengal, Chhattisgarh, Assam, Tripura, Sikkim, Manipur, Meghalaya, Arunachal Pradesh, Nagaland and Mizoram, has the least number of HEIs, mainly because of lesser number of private HEIs in the region.

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[71] The URLs for these organisations are www.ugc.ac.in and www.education.nic.in respectively. These were last visited on 7th March 2013 for the purpose of this study.
[72] The URL for All India Council for Technical Education is …….

Table-4A: Regional Distribution of HEIs-Population				
Region	**Percentage(s) of HEIs**			
	Central	**State**	**Private**	**Total**
North	32.9	22.1	31.6	27.8
West	20.0	24.2	33.2	26.6
South	20.7	29.1	20.5	24.2
East	26.4	24.6	14.8	21.4
Total	100.0	100.0	100.0	100.0

Source: Websites of UGC, MHRD, AICTE and HEIs

Students' Survey

The Population for the online survey of students comprised of students enrolled in degree courses in HEIs. This population was chosen to account for the geographical distribution of HEIs, varying socio-economic backgrounds of the students, different discipline and course choices. It is assumed that these variations would result into differences in the information processing by the students in general and information from websites in particular.

4.4.2 Sampling:

Websites of HEIs:

The study follows stratified random sampling. The HEIs are selected on the basis of their primary mode of funding resulting into three strata which are Central HEIs, State HEIs and Private HEIs. The composition and population of the strata is explained in Table-4B below. The total sample size of the study is 223 which is one-third of the total number of HEIs in India (669). The sample is randomly selected through MS-Excel. The web pages of the sample HEIs have been visited to note down the features of their websites in terms of segmentation ease of use, information content, signals they tend to provide and compliance of norms. The data collection process followed structured observation.

Table-4B: Sample		
Category	**HEIs**	**Sample-size**
Central	139	46
State	287	96
Private	243	81
Total	669	223

Source: HEI Websites Survey

Table-4C: Regional Distribution of HEIs				
	Percentage(s) of HEIs			
Region	**Central**	**State**	**Private**	**Total**
North	34.0	18.9	25.9	24.7
West	23.4	20.0	42.0	28.7
South	21.3	38.9	18.5	27.8
East	21.3	22.1	13.6	18.8
Total	100	100	100	100

Source: HEI Websites Survey

As mentioned in the previous chapter, the sample has been drawn on the basis of mode of financing of HEIs. However, their regional distribution will also be used to present findings from a regional perspective. Table-4C shows the regional distribution of the sample HEIs.

Location of HEIs

Table-4D: Location of HEIs				
	Percentage(s) of HEIs			
City	**Central**	**State**	**Private**	**Total**
Capital City	44.7	33.7	30.9	35.0
Non-Capital City	55.3	66.3	69.1	65.0
Total	100	100	100	100

Source: HEI Websites Survey

Most of these HEIs are located in non-capital cities

Table-4E: Certificate(s) and Degree(s) Awarded by HEIs				
	Percentage(s) of HEIs			
Certificate/Degree(s)	**Central**	**State**	**Private**	**Total**
Certificate/Advanced Certificate	10.6	**14.7**	13.6	13.5
Diploma	12.8	**25.3**	**44.4**	29.6
PG Diploma	17.0	**18.9**	11.1	15.7
UG	83.0	95.8	97.5	93.7
PG	97.9	96.8	95.1	96.4
M.Phil	8.5	23.2	4.9	13.5
PhD	95.7	88.4	76.5	85.7

Source: HEI Websites Survey

Private less interested in research degrees but more so in diploma. State HEIs take more interest in non-degree courses than their Central counterparts. M.Phil as a

degree is not very popular. One reason for the popularity of Non-Degree courses among State and Private HEIs might be their being good sources of fees/revenue

Table-4F: Course(s) in Discipline(s)/Area(s) of Science and Technology				
	Percentage(s) of HEIs			
Certificate/Degree(s)	Central	State	Private	Total
SCI	27.7	34.7	14.8	26.0
SCA	48.9	45.3	43.2	45.3
SCT	**53.2**	**54.7**	44.4	**50.7**
Sciences-Total	**72.3**	**66.3**	**67.9**	**68.2**
MDA	8.5	30.5	48.1	32.3
MED	6.4	13.7	22.2	15.2
ARCH	12.8	10.5	34.6	19.7
TECH	**55.3**	38.9	**82.7**	**58.3**
AG	2.1	22.1	11.1	13.9
Professional Sciences-Total	**63.8**	**68.4**	**95.1**	**77.1**

Source: HEI Websites Survey

Professional courses particularly engineering courses more popular than basic ones. Private HEIs take more interest in professional courses than basic ones.

Table-4G: Course(s) in Discipline(s)/Area(s)of Social Sciences, Arts/Humanities and other areas				
	Percentage(s) of HEIs			
Certificate/Degree(s)	Central	State	Private	Total
HUMI	14.9	16.8	0.0	10.3
LNF	12.8	20.0	2.5	12.1
LNI	27.7	46.3	8.6	28.7
ENG	**42.6**	45.3	32.1	39.9
RS	8.5	9.5	4.9	7.6
Humanities-Total	**53.2**	**57.9**	**32.1**	**47.5**
SST	40.4	43.2	19.8	34.1
SSI	31.9	34.7	11.1	25.6
ECO	**42.6**	**42.1**	21.0	34.5
SW	14.9	27.4	16.0	20.6
Social Sciences-Total	**57.4**	**55.8**	**35.8**	**48.9**
MGT	**31.9**	**58.9**	**77.8**	**60.1**
SKC	6.4	18.9	18.5	16.1
PFA	2.1	28.4	8.6	15.7

LIS	6.4	23.2	12.3	15.7
LIGT	6.4	4.2	0.0	3.1
LAW	6.4	**35.8**	**43.2**	32.3
COM	10.6	34.7	**32.1**	28.7
JMC	2.1	26.3	19.8	18.8
EDU	**27.7**	**42.1**	**32.1**	35.4

Source: HEI Websites Survey

Private HEIs seem to be focusing on Management degrees and areas more professional such as Law, Commerce and Education. Economics appears as a dominant discipline among social sciences. English language is dominant among languages and humanities courses. State HEIs also take interest in courses of professional nature.

Why snowballing?

The study follows snowballing sampling. A list of email addresses of contact persons of HEIs selected for the Websites' study was compiled. In the first month of 2014, the link to the online questionnaire for students was sent to these email addresses with a request to circulate the link to the online questionnaire among their students. The initial plan was to conduct a matching study of students enrolled at HEIs whose websites have been studied. But there were very few positive responses[73]. After waiting for about two months, the link to the online questionnaire for students was sent to email addresses of officials and faculty available from various sources-seminar/conference group emails, existing contacts and online directories. An effort was made to collect more number of responses from institutions other than that of the researcher[74] . The online questionnaire, at the end page, also requested the respondents to circulate the questionnaire among their friends pursuing any degree course from any HEI in India. On receiving email addresses of respondents through their responses to the questionnaire, they were requested again to circulate the questionnaire among their friends pursuing any degree course from any HEI in India[75]. The exercise fetched 309 valid responses[76].

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[73] There was one email from one of the top official of an HEI with comments on questionnaire. Another email from a top official of another HEI advised to seek the guidance of some faculty of the HEI to circulate the questionnaire.
[74] Number of responses from the university the researcher is enrolled in……
[75] Students had the option not to disclose their email address.
[76] Total responses=311, 2 responses from Indian students enrolled outside I ndia.

Table-4H: Social Background of the Respondents			
Caste(s)	**Male**	**Female**	**Total**
General	88	118	206
OBC	35	23	58
SC	14	5	19
ST	13	10	23
No Response	1	0	1
Total	151	156	307

Source: Students' Survey

Table-4I: Age-Distribution of the Respondents			
Central Tendency	**Male**	**Female**	**Total**
Mean	24.0	24.1	24.0
S.D	5.1	4.9	5.0

Source: Students' Survey

Table-4J: Caste-wise Age-Distribution of the Respondents		
Caste(s)	**Mean**	**S.D**
General	24.1	5.1
OBC	24.3	4.4
SC	24.9	4.0
ST	21.4	5.5
Total	24.0	5.0

Source: Students' Survey

Table-4K: Regional Distribution of the Respondents			
Region	**Male**	**Female**	**Total**
North	57	57	114
West	12	14	26
South	10	10	20
East	66	73	139
No Response	6	2	8
Total	151	156	307

4.5 Data Collection

4.5.1 Development of Instruments

Websites of HEIs:

A list of variables for the study of websites has been collected from the survey of literature discussed in the previous chapters. With this list, a pilot study was conducted on a sample of 48 randomly selected HEIs in 2010. The websites of 48 HEIs have been visited for the purpose of understanding their characteristics and analysing their contents. The 48 HEIs (24-government,24-private) had been selected from four clusters, namely, i) National Capital Region of Delhi, ii) Rajasthan,iii) Maharashtra and Gujarat and iv) Uttarakhand. These clusters have a unique feature of being home to all categories of HEIs characterizing Indian HE sector. HEIs had been randomly selected using lottery except in the cases of availability of only one HEI from a given category. The results of the pilot study were presented at two conferences and were later published in a journal[77]. The comments and suggestions received during these presentations and from referees have been utilised to refine and develop the tools for data collection and analysis for the present study.

Structured observation technique was utilised to collect data from websites. The data collection was carried out in two phases. In the first phase, data related to admission process was collected during the months of April to July. The rest of the contents were observed from July to March. he timing for the first phase was crucial as most of the HEIs invite applications during this time. The second phase lasted for seven to eight months and focused on remaining contents of websites. The structured observation included counting the number of clicks of the mouse required to reach the link/content, then position of the link/content on the web-page. The number of folds of the web-page was counted with respect to the laptop screen of the researcher. The position of links was ascertained with respect to the folds. As the number of folds increases, the visibility of links is assumed to change. The structure of observations is presented in Appendix-III.

Students' Survey:

A pilot study was conducted on a batch of newly enrolled M.Phil students of Jawaharlal Nehru University to understand their information processing behaviour and to gauge their expectation from university websites, based on their experiences.

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[77] Pathak (2013)

The results of the survey were presented at a conference and drew useful comments and suggestions. The insights gained from a study on information asymmetry in higher education with respect to engineering colleges also helped in preparation of the online questionnaire for the students.

4.6 Data Analysis

4.6.1 Websites data

Accessibility to Link/Content on website
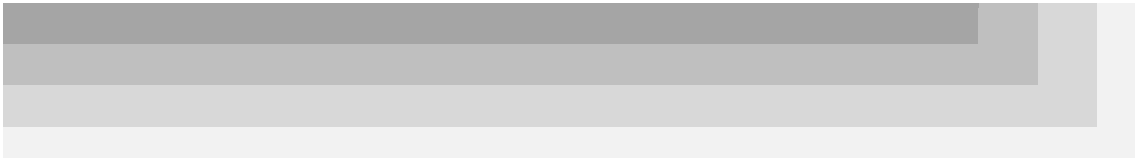
Studies on websites have considered number of clicks of mouse to reach at a particular link or content as a measure of accessibility of information (Mateos *et al*, 2001, Meyer, 2007; Meyer and Jones, 2008; Chadha, 2008; Pathak, 2013, Stack, 2016)[78]. While clicks of mouse take users from one webpage to another and through menu on the same webpage, the placement of a particular link or content on a webpage determines the visibility of the content. This is why Web designers have technically considered position of links or contents on websites as crucial for visibility (Hodas & Lerman, 2013, Laja, 2017). The position of a particular link or content is gauged based on the size of the webpage measured by the number of fold(s) which are integral part of webpage design (Stack, 2016). While the number of clicks required to reach at a particular link or content, the position of link and content; and the number of folds of the webpage are considered to be important for visibility or accessibility of a link or content, they have not been considered together to compare the accessibility of information in the form of order of visibility of link or content in the existing literature. This study proposes an indicator to combine the three parameters and utilises the indicator to compare the visibility of links or contents. To explain the development of the proposed indicator, a specimen webpage is presented below. The specimen webpage illustrates the ordering of content and links on the according to the probability of visibility associated with them. The specimen is based on above mentioned studies and eye tracking study by Djamasbi *et al* (2010).

A typical webpage is represented in Figure-1 below. The parts covered by blue and green comprise one-fold of webpage, which is visible to a user without scrolling the page. The fold can be divided into five major segments. The first of them is the upper segment which usually comprises of a navigation bar containing menu

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[78] Number of clicks to reach at a certain link is counted. If a content is available only in the form of text , then number of clicks to reach at the content is counted.

categorised under specific links. The upper segment along with the navigation bar can be divided into two parts on the basis of attention they attract from a user. The portions of the fold below the upper segment are left, centre, right and down segments. Here, the Left and Right blocks refer to the extreme left and right blocks on the homepage. Similarly, the UP and Down blocks refer to the extreme blocks at the top and at the bottom of the homepage. The Left Up, Right Up, Left Down and Right Down blocks represent up and down parts of the Left and Right blocks. Similarly, Up Left, Down Left, Up Right and Down Right block represent left and right parts of the Top and Bottom blocks. The block enclosed by these blocks is referred to as Centre. Thus, the centre may consist of more than one segment or block of the homepage. The centre is represented by white colour surrounded by red denoting left and right segments. While the left and the right segments are sub-divided into two parts-up and down, the Centre segment is sub-divided into four parts as depicted in the Figure. The fifth segment of the fold is shown by the green colour and is sub-divided into Left and Right. The numbers in the parentheses indicate the rank of sub-divisions on the basis of their visibility to a user. As we read from left to right, the Up Left, Left Up and Centre Left Up sub-divisions have the most visibility. Content placed in these sub-segments will have the highest probability of attracting users' attention. Likewise, all sub-segments are ordered according to their visibility given the fold of the webpage. The order of visibility represented in the following Figure-1 is based on the studies mentioned in the above paragraph.

Figure-4.1 Order of Visibility on a typical Webpage			
Up Left (1)		**Up Right (3)**	
Navigation Bar		**Navigation Bar**	
Left Up (1)	**Centre Left Up (1)**	**Centre Right Up (2)**	**Right Up (3)**
Left Down (2)	**Centre Left Down (2)**	**Centre Right Down (2)**	**Right Down (4)**
Down Left (4)		**Down Right (5)**	

Source: Buscher *et al* (2009), Djamasbi *et al* (2010), , Kutcher (2015), Stack (2016), Laja (2017)

When the user scrolls the webpage down or right to reach at another fold, this induces changes in the order of visibility of segments. The grey shaded areas of the Figure-1 indicate webpages with more than one-fold. Such illustration of webpages with more than one-fold is also shown in Annexure-1. While the visibility of top-left corner of the first fold is not affected with scrolling, the visibility of other segments changes on two counts- (i) scrolling the fold down or right involves clicks of mouse and (ii) scrolling tends to spread the segments of the first fold towards down or right. To capture the resultant change in order of visibility, this study uses the following indicator-

Score_Y= Yc {F (Yp-1) +1}

Here,   Y refers to any link or content

Yc is the number of clicks of mouse to reach at the link or content

F refers to the number of folds

Yp refers to the order of visibility of the link or content on the first fold

The expression (Yp-1) changes with number of folds. If a webpage has only one fold, then the order of visibility remains unchanged for the given number of clicks involved. When the number of folds increases, the expression (Yp-1) reduces the order of visibility of each link or content by one (1) and thus keeps the order of visibility for the top-left segments unchanged as the resultant zero absorbs the multiplication with the number of folds. In the expression {F (Yp-1) +1}, 1 is added to F (Yp-1) so that the indicator captures the impact of number of clicks (Yc). When links or contents are available on homepage and the webpage has only one fold, then the order of visibility remains the same as explained in the Figure-1 above. The score will be a positive number for all positive values of Yc starting from 1. The smaller values would denote more visibility and vice-versa, as the less number of clicks and less number of folds indicates more visibility for the user. Also, the order of visibility

105

is ranked from 1 to 5, the lower indicating the most visible position. The score will attain a value of zero for information not available on webpages, $Y_c = 0$.

4.6.2 Students' survey

Students' Questionnaire

As the aim of the online questionnaire survey of students has been to gauge their perception and experiences related to information processing, the responses have been coded numerically. The responses have been re-coded after the data collection to suit the use of statistical tools, wherever necessary. Since the data is of qualitative nature, non-parametric tests such as chi-square test of independence and analysis of variance have been utilised. As the survey aimed at tracing trends of behaviour, logistic regression has been applied to find factors influencing key responses such as perception towards reputation of HEIs, awareness of category of HEIs etcetera. The questionnaire is presented in the Appendix-IV.

Chapter 5

Information processing and HEIs

5.1 Introduction

The previous chapters described the genesis and plan of study in theoretical and methodological terms. This chapter presents analysis of data obtained from the Websites Survey of HEIs and seeks to answer first five research questions. The analysis seeks to bring out information processing by the HEIs through their websites and interrelationships between contents and institutional characteristics, and interconnectedness of contents in terms of their arrangement on websites. The ordering and segmentation of information would be understood from users' perspectives. The chapter is divided into five sections. The first section presents discussion on websites as virtual faces of HEIs, the second covers use of websites for emitting signals and understanding strategy of HEIs, and the third would present interrelationships among contents of websites and seeks to find causality in the interrelationships. The fourth section analyses regulations and governance of HE through websites of HEIs in terms of basic tenants of E-Governance and adherence of HEIs to existing regulations. The fifth section will summarise the discussion.

5.2 HEIs in the virtual world

Websites represent HEIs in the virtual world. The dynamic nature of websites enables the HEIs to update the contents and reach at a large pool of visitors any time in any part of the world. This wholesome representation of HEIs is expected to be one of the easily available sources of information to visitors. The virtual identity of HEIs can be understood in the following two sub-sections. The first sub-section presents the initial impressions of a website on visitors and the other discusses reliability, authenticity and trust emanated to a visitor.

5.2.1 Virtual faces of HEIs: Impressions on Visitors

The process of reaching at a website may involve searching the URL through search engines (google, yahoo etcetera) or typing the URL (known to the visitor) on the address bar (appearing on the screen) of web browsers (Internet Explorer, Mozilla etcetera). The impressions these URL might create on a visitor can be understood in

analogous to the impression created by names of individuals-signalling identity of a person in terms of social and religious backgrounds. The other important aspect of impressions might the language used during the interaction. The same can be observed for the websites of the HEIs. Navigability of websites and the number of contents add to the impressions as they guide the usability of the websites. These aspects of websites are analysed below.

Type of URLs

The first introduction of a website to a visitor is through the URLs which usually end with phrases (known as domain names) such as .com, .in, .org etcetera. These phrases, with which the URLs of HEIs end, depict varieties in ways the HEIs might wish to introduce themselves. Table-5.1 below presents the distribution of domain names of the HEIs across different categories according to their mode of funding and the impressions emanating from the domain names. These impressions include indentifying the URLs as representing education or academic institutions, organisations and government bodies. A small number of HEIs have their URLs ending with .co.in and .com, generally used by commercial organisations. Thus, the URL acts as the name of website and the domain name as the surname in the virtual world. These surnames indicate different levels of trust and authenticity. This can be understood from research guidelines available from the web-page of the Central Michigan University (CMU).

[79] The CMU webpage suggests using websites ending with .com representing commercial enterprises with extreme caution as main objective of such website is sales. The CMU webpage mentions .org pages to be susceptible to agenda-setting while .gov pages might not allow reporting certain content from their websites.

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[79] Available from https://libguides.cmich.edu/web_research/urls, last retrieved on 04.02.2018

Table-5.1: Type of URLs					
URL ending with	**Percentage of Websites**				
	Central	**State**	**Private**	**Total**	**Message/Signal**
.ac.in	**78.7**	**62.1**	**35.8**	**56.1**	Education/Academia
.ac	0	0	1.2	0.4	
.edu	2.1	3.2	8.6	4.9	
.edu.in	2.1	7.4	**24.7**	12.6	
Sub-Total	83.0	72.6	70.4	74.0	
.gov.in	4.3	0	0	0.9	
.nic.in	4.3	8.4	0	4.5	Government website
.org	4.3	10.5	9.9	9.0	Organisation (from India)
.org.in	0.0	3.2	0	1.3	
.in	4.3	3.2	8.6	5.4	Website from India
.info	0	1.1	0	0.4	Information source
.co.in	0	0	2.5	0.9	
.com	0	1.1	8.6	3.6	Commercial/Company
Total	100	100	100	100	

Source: HEI Websites Survey

In Table-5.1, 74 percent HEIs have their domain names signifying education or academia. The most preferred domain name is .ac.in used by 56 percent HEIs. While 78.7 percent Central HEIs use URL ending with .ac.in, 62 percent State HEIs use domain names. Only 35.8 percent Private HEIs use URL ending with .ac.in. The second most preferred domain name among the private HEIs is .edu.in, which is used by approximately one-fourth of the private HEIs. The use of .edu.in and .edu accounts for one-third of the Private HEIs. The Pearson's Chi-Square test for the above cross-tabulation is significant, implying that the rows and columns are not independent.[80] This implies that the choice of domain names by the HEIs is not independent of their mode of funding. While .org is used by few HEIs across all three categories, only Private HEIs use .co.in or .com to represent themselves. Pathak (2013) also found a small number of HEIs using .org across all categories and mostly Private HEIs using .com or .co.in with exception of only one State HEI. Kothainayaki *et al* (2012) found .edu and .ac.in to be more popular among students than .com or .org domains. The above results seem to be matching the expectations of students.

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[80] Pearson chi-square (22) = 68.3735   Pr = 0.000

Languages of Website:

Having reached at the websites, the first thing that catches attention of an information seeker is the language of the websites. In a multi lingual country like India where endless debates on language of instruction still continue, the language of websites of educational institutions deserve attention. Table-5.2 below presents the distribution of languages of the websites studied. Except websites of two State HEIs, all other websites are in English language. All central and private HEIs have their websites in English. Only two State universities show some regional influence as they have their websites in their regional languages-Telugu and Kannada. The language of homepages studied either implies non-recognition of multilingual character of the country or present some kind of homonisation and influence of globalisation. Generally, the state universities are known to provide instruction in state language(s) but only two state universities are found to have their websites in their state languages. The overwhelming use of English in academics as reflected on the websites may not be in the interest of students seeking information as disparity in understanding of English exists, as evident from competitive examinations, among Indian students. Furthermore, except Central HEIs very few other HEIs provide facilities of translation of the contents available on websites. 61.7 percent Central HEIs allow full translation of their websites. State HEIs appear better than their Private counterparts. Pearson's Chi-square between translation status of websites and mode of funding is significant. This implies that the facility of translation available on websites is not independent of the mode of funding of the HEIs[81]. Thus, language of websites is influenced by homonisation and globalisation, geared towards reaching out to global audience as also reported by Pathak (2013).

Table-5.2 : Reading the Websites				
Language and Translation	**HEIs (in percentage)**			
	Central (N=47)	**State(N=95)**	**Private(N=81)**	**Total(N=223)**
English	100.00	97.89	100.00	99.10
Translation-Full	61.70	11.58	1.23	18.83
Translation-Partial	2.13	11.58	2.47	5.38

Source: HEI Websites Survey

Looking deeper into the status of translation of websites, the homonisation gets revealed clearly, as shown by Table-5.2.1. The two State HEIs having their

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[81] Pearson chi2(4) = 84.1074   Pr = 0.000

websites in Telugu and Kannada provide full translation of their websites into English. The Central HEIs either allow full translation into Hindi (55.32%), one of the official languages of the Union Government of India or link their websites to Google Translate (6.38%). When it comes to partial translation, the Central HEIs again provide options for Hindi only (2.13%). The provision of translation available from websites of the Central HEIs seems to be driven by language policy of the Union Government of India. The State HEIs opt for Google Translate (3.16%) and Hindi (1.05%) for full translation and also for regional languages like Gujarati (1.05%), Marathi (1.05%) and Kannada (3.16%). Some of the Private HEIs have been found to provide option for Google Translate for full translation, and Hindi and Gujarati for partial translation. Overall, the Central HEIs appear to be more inclusive followed by their State peers. Increasing multilingualism on websites, as reported by Callahan & Herring (2012) is very limited in Indian HE. Multilingualism in HE is also limited as Borooah & Sabharwal (2017) find increasing use of English as medium of instruction in India.

Table-5.2.1: Translation Status of Websites of HEIs				
	Central (N=47)	**State(N=95)**	**Private(N=81)**	**Total(N=223)**
Languages	**Full Translation**			
English	0.00	2.11	0.00	2.11
Google Translate Languages	6.38	3.16	1.23	10.78
Hindi	55.32	1.05	0.00	56.37
Gujarati	0.00	1.05	0.00	1.05
Marathi	0.00	1.05	0.00	1.05
Kannada	0.00	3.16	0.00	3.16
Total	**61.70**	**11.58**	**1.23**	**74.52**
	Partial Translation			
Hindi	2.13	5.26	1.23	8.63
Gujarati	0.00	2.11	1.23	3.34
Marathi	0.00	1.05	0.00	1.05
Malayalam	0.00	1.05	0.00	1.05
Tamil	0.00	1.05	0.00	1.05
Kannada	0.00	1.05	0.00	1.05
Total	**2.13**	**11.58**	**2.47**	**16.18**

Source: HEI Websites Survey

Density of Contents on Homepage

When a visitor desires to look for information relevant for him/her, (s)he has to go through the content available on the homepage or might search the relevant information using helpful features. The next sub-section would discuss the search features. In this sub-section we intent do understand the density of contents on homepages through the structural and contextual properties of homepages. A homepage might consist of one or more folds which contain distribution of links or contents. While some links or contents might be in the form of text, some might be presented in the form of images. These images and text again can be rotating, highlighted through flashes or might be static.

Table-5.3: Links and Folds on Homepages					
Variables	**Measures of Central Tendency**	**HEIs**			
		Central (N=47)	**State (N=95)**	**Private (N=81)**	**Total (N=223)**
Number of Folds (A)	Mean	2.5	2.6	2.6	2.6
	S.D.	0.9	1.2	1.3	1.2
Number of Links on Homepage (B)	Mean	63.5	61.9	56.0	60.1
	S.D.	49.8	117.8	69.9	28.6
Number of Links per fold on Homepage (C)	Mean	28.5	27.5	25.6	27.0
	S.D.	13.6	15.6	16.9	15.7

Source: HEI Websites Survey

Table-5.3 above shows mean and standard deviation (SD) of number of folds, number of links on homepage and number of link per fold on homepage. A fold of a website refers to the portion of website visible to the visitor without scrolling the screen. The term fold is used for newspapers in the same sense. The number of folds that a website requires to be viewed completely with scrolling of the screen has the same effect on the visitor as the number of folds of a newspaper has on a reader in terms of prioritisation of information. The mean of number of folds is almost same for the three categories of HEIs and exactly same for State and Private HEIs but the SD for the Central HEIs is the lowest. With the same mean and the least SD of number of folds, the Central HEIs have the highest mean of number of links on the homepage while their private counterparts have the least mean of number of links on the homepage. The mean value of number of links on homepage for the Private HEIs is even less than the mean for total number of HEIs. The SD for State HEIs is the

highest while that for their Central counterparts is the highest, more than double as compared to the SD for the Central HEIs.

The number of links per fold on homepage, which is obtained by dividing the number of links on homepage by the number of folds, has the highest mean for the Central and the lowest for the Private HEIs while the SD is highest for the Private HEIs. This indicates that the Central HEIs use most of the space of their homepages for links while the Private HEIs leave most of the space of their homepages to be used for other contents such as rotating contents and pictures. A representative illustration of homepages of a Central and a Private HEI presented in Appendix-V (Figures-5A.1 and 5A.2) would help in understanding this strategy which indicates the intensive use of folds for displaying pictures-static and dynamic by the private HEIs. These visual images help in highlighting certain intended features. Moreover, Private HEIs are comparatively newer in comparison to Central and State HEIs. This seems closer to the findings of Nwagwu & Agarin (2008), who in their study of websites of 30 Nigerian universities found newer universities to be having fewer links comparatively. This might be because the new HEIs feel the need for branding more than the old ones who can reap on their reputation.

The variables number of folds and number of links on homepage are linearly related to the number of links per fold on homepage. Their correlation coefficients are presented in Table-5C.1 below. The correlation coefficient between number of folds and number of links per fold on homepage is -0.5 which is significant at 95% level . This implies that given the number of links on homepage, the number of links per fold decreases as number of folds increases. This negative correlation is higher (-0.66) for Central HEIs and low for Private ones. The correlation coefficient between number of links on homepage and number of links per fold on homepage is 0.71 which is also significant at 95% level of significance. This positive association is higher (0.75) for Private HEIs and comparatively low for the Central HEIs.

Table-5.3.1: Correlation coefficients of Links and Folds on Homepages				
	HEIs			
Variables	Central (N=47)	State(N=95)	Private(N=81)	Total(N=223)
A and B	0.02	0.12	0.12	0.11
B and C	0.66*	0.70*	0.75*	0.71*
C and A	-0.66*	-0.50*	-0.44*	-0.50*

Source: HEI Websites Survey

113

Number of Clicks	Central (N=47)	State(N=95)	Private(N=81)	Total(N=223)
Table-5.4: Attention Catching Visuals on Websites of HEIs				
	Dynamic (Rotating/Revolving) Pictures			
Homepage	72.34	69.47	77.78	73.09
One click from Homepage	0.00	1.05	8.64	3.59
Two clicks from Homepage	2.13	1.05	0.00	0.90
Not Available	25.53	28.42	13.58	22.42
	Dynamic (Rotating/Revolving) Contents			
Homepage	61.70	77.89	65.43	69.96
One click from Homepage	0.00	2.11	8.64	4.04
Two clicks from Homepage	4.26	1.05	0.00	1.35
Not Available	34.04	18.95	25.93	24.66
	Flash Messages			
Homepage	59.57	64.21	50.62	58.30
One click from Homepage	0.00	3.16	8.64	4.48
Two clicks from Homepage	4.26	2.11	0.00	1.79
Not Available	36.17	30.53	40.74	35.43
	Static Images			
Homepage	61.70	67.37	61.73	64.13
One click from Homepage	2.13	2.11	6.17	3.59
Two clicks from Homepage	4.26	2.11	1.23	2.24
More than Two Clicks	4.26	3.16	3.70	3.59
Not Available	27.66	25.26	27.16	26.46

Source: HEI Websites Survey

As mentioned above, the lowest mean of number of links per fold on homepage of the Private HEIs indicate that they utilise the space on their homepage for other contents than links. This is reflected by the fact that the Private HEIs are ahead in displaying rotating pictures on their homepages, as depicted by Table-5.4 above. The State HEIs, whose mean of number of links per fold on homepage is more than that of the Central HEIs and less than the Private HEIs, lead in utilising the space on homepage with dynamic contents, flash messages and static images[82]. It is to be

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[82] Dynamic contents include revolving or rotating texts and images. Revolving contents refer to texts and mages which appear from one corner/side of the webpage and disappear at other side/corner.

114

noted that these visuals catch the attention of the visitor and may be spread across the website and folds. As they are generally spread across folds, it is difficult to ascertain their position on the fold for the purpose of calculating the visibility score described in the previous chapter. However, these visuals are effective in attracting the attention of the visitor irrespective of their placement on the webpage.

Pearson's Chi-square for number of clicks required to reach at rotating pictures and rotating contents with mode of funding is significant.

For, rotating pictures- Pearson chi-square $(6)^{83}$ = 15.6710   P-value= 0.016

For, rotating contents- Pearson chi-square (6) = 15.6788   P-value = 0.016

This proves that the placement of rotating pictures and rotating contents are not independent of mode of funding of HEIs.

Pearson's Chi-square for number of clicks required to reach at flash messages with mode of funding is significant at 90% level of confidence. Even if we do not consider this result, this adds to the impact of mode of funding and utilisation of visuals by the HEIs to attract the attention of the visitors. The contents of these visuals appear very important in this light. A detailed discussion of the contents of these visuals will be presented under the section Signals and Strategies of the HEIs. These visuals along with ordering of information measured by scores help in understanding the hierarchy of information provided indicating differing accessibility for different kinds of information.

Navigability of Websites

A website might comprise of more than one fold and page which contain considerable number of links and visuals across them. In such a situation, a visitor has to locate the desired information navigating through these links and visuals. While the number of folds, pages and presence of visuals tend to distract the visitor by attracting him/her towards them, this hardship in locating desired information on website can be overcome by features which can guide the user or help in searching. Presence of such features on websites is known as navigability of websites. Table-5E presents the availability of such features on websites of HEIs.

Rotating contents move around in circular direction (either up-down/down up or right-left/left-right) in specific part of the webpage.

Flash message refer to texts fitted with flashes either as superscripts or the texts flashing as a whole

Static images refer to images remaining stationary at specific places on the webpage.

[83] Degrees of freedom=6

The Table-5.5 shows the poor state of websites of HEIs in providing assistance in searching or locating desired information on their websites as less than one percent of HEIs in any category mentioned above provide the features of navigability. Except the availability of A to Z link, which lists all links on website at one place, the Central HEIs have the least number of other features of navigability. State HEIs perform better than their Central and private counterparts in providing these features except for the A to Z link.

Table-5.5: Navigability Features on Websites of HEIs			
Features	Central (N=47)	State(N=95)	Private(N=81)
Person search	0	0.07	0.01
Site Search	0.26	0.46	0.34
A to Z link	0.06	0.04	0.05
Site Map	0.2	0.35	0.34

Source: HEI Websites Survey

5.2.2 Reliability and Trust

Table-5.6: HEIs and their reliability					
Variables	Measures of Central Tendency	HEIs			
		Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)
Age of HEIs	Mean	30.7	31.0	10.8	23.6
	S.D.	63.9	46.9	43.8	24.5
Number of External Links	Mean	6	4.8	2.3	4.2
	S. D.	15.5	20.7	11.6	13.1
Correlation coefficient		-0.03	0.09	0.6*	0.16*

Source: HEI Websites Survey

Average age of the HEIs, as on the end of 2016, is 23.6 years. The HEIs funded by government are older than their private counterparts, as privatisation received upsurge after 80s only. This is also indicated by the standard deviation of age which is also the least for private HEIs. As reputation built over the years, differences in ages of HEIs appear as one of the important variables. One-way ANOVA with age as dependent variable and mode of funding as independent variable gives significant F-statistic. Bonferroni decomposition gives significant differences between the means of Central and Private, and State and Private HEIs.

In webometrics, external links on the web pointing to a website indicates the popularity of the link/URL (Jeyshanker & Babu, 2009). Analogously, the number of external links available on a website can be understood to indicate the effort to popularise the links mentioned and propensity to indicate the credibility of the HEI mentioning the external links which are of different regulating bodies, funding agencies, departments of government etcetera. The mean number of external links on the homepages of Central HEIs is the highest and that of the private HEIs is the lowest while the State HEIs have the highest standard deviation for the same. Pearson's Chi-square between number of external links and mode of funding is significant.

If age of HEIs is considered to indicate reputation and the number of external links to be an indicator for credibility or reliability, then there appears an association between these two variables. Correlation coefficients between them are 0.16, 0.6, 0.09 and -0.03 for all HEIs, Private, State and Central HEIs respectively. The first two correlation coefficients are significant at 95% level of confidence. Positive correlation coefficients imply growing external connections with age of HEIs. The negative coefficient for the Central HEIs imply that the older HEIs tend to have fewer external links while the relatively younger HEIs have more external links on their websites. This might be due to the established reputation of the older Central HEIs that they do not feel the need to display external linkages for credibility. In this context, it appears necessary to look into these external connections or links. A summary of these external links is presented in the Table below.

Authenticity of Information

To ascertain the authenticity of information available on websites of HEIs, availability of links claiming authorship or copyright of the content and updatedness/currency (in_wbcurtupdt) of the website through the date of last update has been noted[84]. It has been found that most of the HEIs have links to claim authorship or copyrights on their homepages itself but very few of them indicate updatedness/currency as the date of last update has not been found on most of them.

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[84] in_wbcurtupdt is indicator for updatedness of website. The variables denoted by the prefix (in_) are the corresponding indicators for the visibility of the content. The development of these indicators has been discussed in Chapter-4.

Authorship of content (in_authrwebst) adds authenticity to the information provided[85]. Most of the HEIs under study display the authorship in the form of ownership of copyrights or disclaimer on their homepages. Very few have been found without such information display which renders credibility to the contents shared. Along with credibility, the seeker wants information to be up to date. The link or information mentioning the last update of the page or the website informs the visitor and guides his interests and use of the information.

Table-5.7: Authenticity and Updatedness Scores					
Scores	Mean and SD	Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)
in_authrwebst	Mean	7.64	8.64	8.48	8.37
	SD	3.96	7.62	5.71	6.30
in_wbcurtupdt	Mean	1.07	2.89	1.35	1.95
	SD	3.37	11.74	3.51	8.11
Correlation Coefficient		0.19	0.80*	0.08	0.62*

Source: HEI Websites Survey

The above Table-5.7 shows the mean and standard deviations of scores of authorship of websites and their currentness. The scores are calculated as explained in the previous chapter. As evident from the Table-5.6, the mean and standard deviations for Central HEIs are the lowest indicating the highest visibility of authorship and currentness or currency of information on their websites. The measures of central tendency are the highest for the State HEIs indicating the lowest visibility in the group. The two scores also have significant strong positive correlation among them with the coefficient being 0.618. This indicates that when an HEI keeps higher visibility for authorship of its website, it also keeps the visibility for currentness to be high. The correlation coefficient for the State HEIs is stronger and significant.

In the absence of authorship and currentness details, visitors might use calendar of events (in_calevnts) and institutional news (in_ininews) as proxies for currentness and authenticity. The mean and standard deviations of the scores calculated for these links are mentioned in the Table-5.8 below.

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[85] The implications of contents for authenticity and reliability have been used from Middleton *et al* (1999).

Table-5.8: Authenticity and Currentness Scores					
Scores	**Mean and SD**	**Central (N=47)**	**State (N=95)**	**Private (N=81)**	**Total (N=223)**
in_calevnts	Mean	4.30	4.56	2.87	3.89
	SD	3.59	6.76	3.20	5.13
in_ininews	Mean	3.17	4.77	3.46	3.96
	SD	3.03	6.37	4.08	5.06
Correlation Coefficient		0.12	0.58*	0.38*	0.50*

Source: HEI Websites Survey

The Private HEIs have the highest visibility score for calendar of events and the Central HEIs for institutional news as the lower scores mean higher visibility. The State HEIs seem to be following the same trend as observed above of keeping the links related to currentness, calendar of events and institutional news less visible as compared to their Central and Private counterparts. The two scores are significantly correlated except for Central HEIs. Nonetheless, the three significant coefficients establish the positive correlation between the two scores.

Table-5.9: Proxies for Authenticity and Currentness				
Scores	**Central (N=47)**	**State(N=95)**	**Private(N=81)**	**Total(N=223)**
in_authrwebst	in_calevnts			
	0.08	0.62*	0.30*	0.49*
	in_ininews			
	0.13	0.70*	0.23*	0.52*
in_wbcurtupdt	in_calevnts			
	0.35*	0.53*	-0.02	0.46*
	in_ininews			
	0.41*	0.74*	-0.03	0.52*

Source: HEI Websites Survey

Having analysed the linear association between authenticity and currentness, and calendar of events and institutional news; let us now check the interrelationships among the two sets of scores. Table-5.9 above presents correlation among these scores. It is evident from the Table that score for authorship, which is considered to represent the authenticity of information on websites, is significantly correlated with scores of calendar of events and intuitional news except for the Central HEIs. It is to be noted that the Central HEIs have been found to have the best visibility for authenticity on their websites. Thus, for the State and the Private HEIs, calendar of events and institutional news can act as proxy for authorship to indicate authenticity

119

of information. An HEI with visible calendar of events and institutional news can be assumed to be responsible author or creator of contents on its website.

The score for currentness of the website is significantly correlated with calendar of events and institutional news except for the Private HEIs. The association is stronger with institutional news. The negative correlation obtained for the Private HEIs although not statistically significant and smaller in value indicate that difference in government funded and privately managed HEIs.

5.3 Signals and Strategy

A visitor on a website is attracted by several visually catching contents. Generally, there four types of such visually catching contents- (i) rotating pictures (RP), (ii) static images (SI), (iii) rotating contents (RC) and (iv) flash messages (FM). Rotating pictures and Rotating contents are chain of pictures and contents revolving or rotating in a panel. Static images are placed at various places of web-pages or websites usually with some content. Flash messages refer to the contents which have some blinking superscript or subscript fixed with them. It is to be noted that the images are more attractive than contents and rotating ones are more attractive than those being static. These are visually attractive tools are utilized to channelise the attention of the visitor towards some particular content(s). These tools are not only strategic in their use but also serve the purpose of signalling by the HEIs. This section deals with these signals and strategies in information ordering by the HEIs.

5.3.1 Images and Dynamic Contents

Images: Rotating and Static

In this sub-section, content analysis of rotating and static images displayed on websites is presented. These images range from events organised in the HEIs, to people, to features indicating strength of the HEIs. As for illustration, Table-5.10 presents the description of display of events through images.

Table-5.10: Events in Images on Websites of HEIs (in percentage)						
Events	Type	Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)	Pearson's Chi-Square#
Events excluding Convocat ion	Rotating	51.06	30.53	37.04	37.22	5.68*
	Static	6.38	4.21	12.35	7.62	4.24
	Rotating or Static	55.32	32.63	43.21	41.26	**6.88****
Convocat ion	Rotating	17.02	14.74	11.11	13.90	0.96
	Static	2.13	3.16	1.23	2.24	0.74
	Rotating or Static	17.02	17.89	11.11	15.25	1.70
All Events	Rotating or Static	57.45	42.11	46.91	47.09	2.97

Source: HEI Websites Survey
#Degrees of freedom=2

The Table shows that 57.45 percent Central HEIs display various events held in their institutions through at least one of the rotating or static means. They are followed by the Private HEIs with 47 percent. The Table presents events in two categories—convocation and events excluding convocation. Pearson's Chi-Square for HEIs displaying events excluding convocation through any of rotating or static means and their mode of funding is significant. This indicates that the display of such events is not independent of mode of funding of the HEIs.

Table-5.11: People in Images on Websites of HEIs		Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)	Pearson's Chi-Square#
Top Functionaries HEI	Rotating	46.81	31.58	27.16	33.18	
Functionaries except VC (A)	Static	6.38	14.74	9.88	11.21	2.43
VC (B)	Static	12.77	36.84	8.64	21.52	23.29**
At least A or B	Static	17.02	40.00	14.81	26.01	16.91**
Top Functionaries HEI	Rotating or Static	53.19	57.89	41.98	51.12	4.54
Dignitaries	Rotating	44.68	23.16	29.63	30.04	6.94**
	Static	0.00	4.21	4.94	3.59	2.28
	Rotating or Static	44.68	14.74	34.57	28.25	5.58*
Faculty in Events	Rotating	21.28	7.37	14.81	13.00	5.74*
Faculty	Static	17.02	2.11	2.47	5.38	15.86**
Faculty	Rotating or Static	34.04	9.47	17.28	17.49	13.16**
Students in Events (C)	Rotating	36.17	20.00	32.10	27.80	5.27*
Students in various activities (D)	Rotating	17.02	10.53	45.68	24.66	30.95**
At least C or D	Rotating	44.68	24.21	61.73	42.15	25.39**
Students in various activities	Static	0.00	4.21	33.33	13.90	40.60**
Students	Rotating or Static	44.68	27.37	70.37	46.64	32.58**
Celebrities	Rotating	0.00	0.00	7.41	2.69	10.81**

Source: HEI Websites Survey
#Degrees of freedom=2

Having looked into the display of events through images, let us now look into the display of kind of people on the websites as depicted in Table-5.11 above. Unlike the previous case, the State HEIs lead the display of images of top functionaries especially that of the Vice-Chancellor (VC). The Central HEIs seem to prefer the display of images of top functionaries through rotating images. They also lead in displaying the images of dignitaries like the President, the Governor, and Ministers etcetera. The Central and Private HEIs display the images of faculty through rotating pictures and of their participation in events while the Sate HEIs mostly display static images of faculty. The Private HEIs come to the leading front when it comes to displaying the images of students and celebrities from entertainment and sports world. While the government funded HEIs showcase participation of dignitaries their private counterparts prefer to display their fondness to celebrities to attract young students.

122

The display of images of students in static and rotating means also signal the target audience of Private HEIs. Most of the contents mentioned in the above Table have significant Pearson's Chi-Square with mode of funding of HEIs. This clearly establishes that the different signals emitted by the HEIs are not independent of their mode of funding. Stack (2016) also noticed the display of images of celebrities, alumni and students on the web-pages of HEIs for marketing purposes whereas the findings here indicate the displaying strategies guided by mode of funding of HEIs.

Table-5.12: HEIs in Images on their Websites (in percentage)						
Contents	Type	Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)	Pearson's Chi-Square#
Buildings	Rotating	44.68	50.53	46.91	47.98	0.49
	Static	14.89	14.74	12.35	13.9	0.26
	Rotating or Static	53.19	63.16	56.79	58.74	1.49
Campus	Rotating	23.4	18.95	20.99	20.63	0.39
	Static	8.51	9.47	13.58	10.76	1.08
	Rotating or Static	27.66	25.26	32.1	28.25	1.02
Local City/Local Information	Rotating	2.13	4.21	3.7	3.59	0.4
	Static	2.13	2.11	1.23	1.79	0.23
	Rotating or Static	4.26	6.32	4.94	5.38	0.31
Laboratory	Rotating	4.26	7.37	14.81	9.42	4.70*
	Static	6.38	0	4.94	3.14	5.57*
	Rotating or Static	10.64	7.37	18.52	12.11	5.23*
Library	Rotating	4.26	6.32	11.11	7.62	2.39
Main gate/Legendary Personalities	Rotating	12.77	10.53	7.41	9.87	1.04
	Static	23.4	26.32	8.64	19.28	9.42**
	Rotating or Static	34.04	34.74	14.81	27.35	10.07**

Source: HEI Websites Survey
#Degrees of freedom=2

HEIs display themselves through images of their buildings, campus, academic infrastructure such as laboratory and iconic images like main entrance gate, images of legendary persons associated with the HEIs. Table-5.12 above shows the content analysis of display of these contents by the HEIs. The State HEIs appear to display the images of the buildings and information related to local city the most as compared to their Central and Private peers. The Private HEIs showcase their campus more often.

The display of laboratory and iconic images appear not to be independent of mode of funding as the Pearson's Chi-Square is significant for them. The Private HEIs display laboratory and library more often as compared to their government funded peers to attract the attention of the visitors.

Content	Type	Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)	Pearson's Chi-Square#
Table-5.13: Quality Signals on Websites of HEIs						
International Linkages	RP	6.38	1.05	7.41	4.48	4.6234*
	RC	0	0	3.7	1.35	5.331*
	SI	2.13	0	3.7	1.79	3.4424
	RP or SI	8.51	1.05	11.11	6.28	**8.0224****
Rank/Quality	RP	4.26	0	8.64	4.04	**8.4383****
	RC	6.38	6.32	13.58	8.97	3.3137
	FM	0	5.26	7.41	4.93	3.5186
	SI	2.13	0	2.47	1.35	2.2831
	RP or SI	6.38	0	11.11	5.38	**10.7186****
	RC or FM	6.38	10.53	19.75	13	5.598*
Facilities	RP	17.02	9.47	13.58	12.56	1.753
	RC	4.26	4.21	7.41	5.38	1.0258
	SI	2.13	3.16	8.64	4.93	3.8033
	RP or SI	19.15	12.63	22.22	17.49	2.9006
E-Facilities	FM	8.51	11.58	11.11	10.76	0.3243
Research Output	RP	4.26	3.16	0.00	2.24	3.09

Source: HEI Websites Survey
#Degrees of freedom=2

Tables-5.11 and 5.12 depict how the Private HEIs attempt to target their audience , that is, the students with display of images of their current students, campus laboratory and library. They also lead the pack in emitting quality signals to students. In displaying international linkages, rank or quality of education, and facilities; the Private HEIs outnumber the government funded HEIs, as evident from Table-5.13. The significant Pearson's Chi-Square for International Linkages and Rank or Quality of Education also establishes the fact the display of quality signals is not independent of mode of funding. It is to be noted here, the display of information through visuals is intended to attract the attention and not to provide information in

general. The contents displayed through visuals might even overshadow information without them and help in diverting attention from information not in the interest of the HEIs. These implications would be discussed in the later sections. The difference arising out of difference in mode of funding is also indicated by the display of research output by the HEIs in the form of awards and honours received by the faculty for their research, images of publications and output in various forms. The Private HEIs have not been found to display such images on their websites.

Type	Table-5.14: Information for Students though Images on Websites of HEIs (in percentage)				
	Central (N=47)	State(N=95)	Private(N=81)	Total(N=223)	Pearson's Chi-Square#
RP	10.64	4.21	20.99	11.66	**12.0084****
SI	2.13	2.11	4.94	3.14	1.3545
RP or SI	12.77	6.32	23.46	13.9	**10.797****

Source: HEI Websites Survey
#Degrees of freedom=2

The attempt to target students through images becomes more evident when the information displayed through images are of direct relevance for students, such as information related to admission, courses and programmes, syllabus, fees etcetera. In the Table-5.14, the Private HEIs outnumber their government funded peers in displaying such information through their websites. Among the government funded HEIs, the Central HEIs use their websites more often in displaying images containing information for students. This difference in utilisation of images for displaying information for students is also indicated by the significant Pearson's Chi-Square.

Dynamic Content:

As stated above, images attract more as compared to other contents. But when contents are made dynamic through rotation or flash features added to them, they attract the attention of the visitor more than other contents without these features. Though less effective than images, rotating contents and flash messages appear to be second most eye-catching to the visitor. In the analysis presented above, the focus has been mainly on the images. Dyanmic contents (RC and FM) have been analysed in the Tables above in the event of the contents of the images being displayed through dynamic contents also. Here, in the present sub-section, analysis of dynamic contents will be presented.

Students are one of the important target audiences for an HEI. Attracting the attention of students through images-dynamic (rotating) and static has been observed in the analysis presented above. It has also been observed that information pertaining to students is also displayed through images. The content analysis of dynamic contents also indicates the utilisation of dynamic features to highlight information relevant for students. There are dynamic contents featuring information related to admission, results, courses and programmes and other related information relevant for students. Though the percentage of HEIs utilizing dynamic features to such contents is low, the presence of such contents supports the findings from the above sub-section. The dynamic contents offering information on departments or centres of study are only displayed by the Private HEIs. These academic units are integral part of any HEI but highlighting their existence or a chose few of them is a strategic decision on the part of an HEI. Information for prospective students appears to be the content with most numbers. It is to be noted here that information for prospective students comprises of presence of at least one of the contents out of admission information, department/centre, syllabus, courses/programme and entrance results. Similarly information for current students refers to the presence of at least one of the contents out of department/centre, syllabus, courses/programme, examination and examination results. The Private HEIs can be observed to be leading in utilizing dynamic contents for courses/programme, results of entrance and examinations, information for current and prospective students, why to choose the HEI and placement history or employment assistance provided by the HEI. The strategic use of dynamic contents to target students by the Private HEIs is clearly observable. The display of information related to examinations and placement history or employment assistance provided by the HEI according to the mode of funding of the HEI has significant Pearson's Chi-Square, indicating the non independence of these displays and mode of funding of the HEIs.

Table-5.15: Information for Students though Rotating Contents s on Websites of HEIs (in percentage)					
Contents	Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)	Pearson's Chi-Square#
Admission Information	8.51	7.37	8.64	8.07	0.111
Department/Centre	0	0	1.23	0.45	1.761
Courses/Programme	2.13	0	3.7	1.79	3.4424
Syllabus	0	1.05	0	0.45	1.3534
Entrance Results	0	1.05	2.47	1.35	1.4731
Examination Results	4.26	4.21	6.17	4.93	0.4173
Information for Current Students	6.38	5.26	9.88	7.17	1.4533
Information for Prospective Students	10.64	9.47	13.58	11.21	0.7603
Why to choose HEI	2.13	6.32	11.11	7.17	3.7874
About HEI	6.38	11.58	11.11	10.31	1.005
Examinations	0	8.42	2.47	4.48	**6.4119****
Placement History/ Employment Assistance	2.13	2.11	11.11	5.38	**8.2026****

Source: HEI Websites Survey
#Degrees of freedom=2

Table-5.16: Information for Students though Flash Messages on Websites of HEIs (in percentage)					
Contents	Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)	Pearson's Chi-Square#
Admission Information	14.89	18.95	27.16	21.08	3.1415
Courses/Programme	2.13	2.11	3.7	2.69	0.4987
Information for Prospective Students	12.77	11.58	13.58	12.56	0.1619
Anti-Ragging	2.13	2.11	0	1.35	1.7347
Entrance Results	0	3.16	2.47	2.24	1.4605
Examination Results	2.13	8.42	3.7	5.38	3.149
About HEI	17.02	14.74	9.88	13.45	1.5383
Examinations	4.26	6.32	7.41	6.28	0.5026
Placement History/ Employment Assistance	2.13	1.05	1.23	1.35	0.2856

Source: HEI Websites Survey
#Degrees of freedom=2

After looking into the displaying of information relevant for students through rotating contents, let us analyse the same for another form of dynamic contents- flash

messages. The analysis is presented in Table-5.16 above. The Private HEIs are found to be flashing information related to admission and courses or programmes more often. Information for Prospective students which ensures displaying of at least one of the admission, courses or programmes, entrance results and anti-ragging, is also flashed mostly by the Private HEIs although they do not flash anti-ragging information. The Central HEIs flash link leading to 'about HEI' and Placement History more often. The State HEI use flash messages to highlight Examinations and examinations results more often as compared to their peers from Central and Private Category. Though the cross-tabulation does not qualify the Pearson's Chi-Square test but provides ground for comparison of links or contents related to the contents presented in the Table below with indicators generated by combining the number of clicks, position of the links or contents and number of folds. Before such comparisons are discussed in the next section, a look into the information related to day to day activities and governance related links flashed on the websites is presented in Table-5.17. The analysis of contents presented in the Table is useful for all kinds of visitors of the websites of HEIs. The contents analysed in the Table are mostly related to information any organization should regularly provide. The contents are displayed with rotating or flash features.

The Table shows that except for two cases of contents *Whatsnew* and Calendar of Events, the Private HEIs do not come closer to their government funded peers. Between the government-funded HEIs, the State HEIs are found to use dynamic contents for calendar of events, institutional news and tenders more than the Central HEIs. The Table shows the government funded HEIs to display notices or announcements using rotating or flash features more than their Private peers. Pearson's Chi-Square is also significant for display of notices or announcements with flashes and at least with rotating or flash messages. The differences in the three kinds of HEIs are minimal in the case of displaying *Whatsnew* through dynamic contents. These *Whatsnew* contents refer to the update section of the webpage where organization generally display latest information or update. The Table shows that the Private HEIs do not display tenders through dynamic contents. While the Central HEIs use only flash messages for highlighting tenders, the State HEIs use both the dynamic features-rotating and flash. Here, also the Pearson's Chi-Square is significant for display of tenders with flashes and at least with rotating or flash messages. The Private HEIs also do not display circulars through dynamic contents while the

government funded HEIs use these features. These differences in using dynamic contents for tenders and circulars indicate the differences in day to day governance of the government funded and Private HEIs. Since the Private HEIs are not bound to follow rules and regulations for their day to day functioning and finances, the information related to tenders and circulars are not the ones they have to attract attention of the visitor. These contents are important only for the government funded HEIs. This might also be due to the different regulating environment for the two kinds of HEIs. These differences will be discussed in detail in the seventh chapter. Pearson's Chi-Square is significant for Notice or Announcements, Tenders, Institutional News and Job Vacancies; establishing the non-independence observed due to mode of funding.

The State HEIs lead in displaying the contents related to calendar of events and institutional news. The Pearson's Chi-Square is significant for display of institutional news through rotating contents by different kinds of HEIs according to their mode of funding. The non independence of display and mode of funding is statistically established. These two particular links have been analysed in Table-5.8 above where it was found that the visibility score as measured by the indicators for theses two links was the highest for the Sate HEIs. As the higher scores indicate lesser visibility, a negative relation is observed between the visibility of links and displaying the contents using dynamic features. The State HEIs which have the least visibility for the two contents display them the most using dynamic features.

Table-5.17: Information in Dynamic Contents on Websites of HEIs (in percentage)						
Contents	Type	Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)	Pearson's Chi-Square#
Notice/ Announcements	RC	29.79	30.53	20.99	26.91	2.27
	FM	31.91	15.79	6.17	15.70	**14.90****
	RC or FM	44.68	38.95	23.46	34.53	**7.36****
Whatsnew	RC	19.15	18.95	18.52	18.83	0.01
	FM	19.15	18.95	18.52	18.83	0.01
	RC or FM	19.15	22.11	20.99	21.08	0.17
Tender	RC	0.00	3.16	0.00	1.35	4.10
	FM	8.51	9.47	0.00	5.83	**7.93****
	RC or FM	8.51	10.53	0.00	6.28	**8.74****
Circular	RC	4.26	1.05	0.00	1.35	4.16
	FM	2.13	4.21	0.00	2.24	3.54
	RC or FM	4.26	5.26	0.00	3.14	4.23
Calendar of Events	FM	12.77	24.21	19.75	20.18	2.57
	RC	17.02	18.95	17.28	17.94	0.12
	RC or FM	27.66	32.63	30.86	30.94	0.36
Institutional News	RC	25.53	37.89	23.46	30.04	4.91*
	FM	19.15	22.11	7.41	16.14	**7.37****
	RC or FM	36.17	44.21	25.93	35.87	**6.36****
Job Vacancies	RC	2.13	6.32	1.23	3.59	3.63
	FM	14.89	9.47	3.70	8.52	4.97*
	RC or FM	14.89	14.74	4.94	11.21	5.03*

Source: HEI Websites Survey
#Degrees of freedom=2

Here, it is to be noted that the visibility score indicators are developed using the number of clicks, the position of links or contents and the number of folds. The number of clicks has been recorded for all the links or contents present in all forms- static and dynamic. That is, the visibility score indicators do not exclude the information provided through dynamic features rather includes all possible ways of presentation of information. Thus, a negative association observed above indicates that the State HEIs place the links or contents related to calendar of events and institutional news such that their visibility scores increases. They might tend to compensate for the lesser visibility by using dynamic features. To illustrate the

development of visibility score indicators, an analysis of clicks and position of calendar of events is presented in Table-5.17.1 below. The differences in the percentages of HEIs in each category in terms of distance for the visitors measured through number of clicks and position on the webpage as compared to display of calendar of events through dynamic contents establishes the two ways of information processing by the HEIs for the same information.

Table-5.17.1: Calendar of Events-Clicks and Position on Websites (in percentage)				
Description	Central (N=47)	State(N=95)	Private(N=81)	Total(N=223)
Number of Clicks				
Homepage	80.85	60.00	56.79	63.23
One click from homepage	8.51	9.47	12.35	10.31
Two clicks from homepage	0.00	2.11	1.23	1.35
Five Clicks from homepage	0.00	1.05	0.00	0.45
Not Available	10.64	27.37	29.63	24.66
Total	100	100	100	100
Position on Webpage/Website				
Most Visible	21.28	15.79	23.46	19.73
Second Most Visible	25.53	24.21	25.93	25.11
Third Most Visible	29.79	18.95	13.58	19.28
Fourth Most Visible	12.77	13.68	7.41	11.21
Not Available	10.64	27.37	29.63	24.66
Total	100	100	100	100

Source: HEI Websites Survey

The same applies to other links and contents as well. These differences in placing links and contents on a particular webpage on or from homepage, on a particular place on webpage and through various means-static or dynamic contents or images, texts or links constitute several strategies available to the HEIs to make information of different kinds and ordering them differently to create hierarchy in accessibility to information.

5.3.2 Hierarchy of Information on Websites of HEIs

The case of calendar of events and institutional news provides ground for comparison of displaying contents through images-static and rotating, and dynamic contents to understand the strategies of HEIs and the ordering of information on their websites. Comparisons with indicator scores would also help in understanding whether a higher

score for any content is the result of constrained optimisation given the webpage and number of folds or the strategy of information hierarchy in order to make information availability to serve some desired objectives. This sub-section will present such comparisons of scores of visibility indicator for the contents analysed in the preceding sub-sections. It is to be noted here, some contents are displayed only through images and dynamic contents, rendering them incomparable. Such contents analysed in the preceding sub-sections are- images of students in events and in various activities, images of faculty in events and introductory, images of functionaries of HEIs, images of dignitaries and celebrities, images of events (not calendar of events), images of buildings, campus, main gate and legendary personalities associated with HEIs. These contents are effective in providing signals only through images. Contents displayed using dynamic features and some contents shown as image such as information relevant for students; contact details of faculty and their specialisation will be analysed and compared using scores of visibility indicator. The visibility score indicators for these contents are presented in Table-5.18 below-

Table-5.18:Indicators for Contact, Faculty Specialisation and Current Students						
Indicators	Central Tendency	Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)	F-Statistic#
in_cntctdtl	Mean	6.56	6.26	7.25	6.68	0.79
	SD	3.09	5.64	5.65	5.21	
in_heiemail	Mean	5.87	7.74	6.70	6.97	0.87
	SD	3.06	11.43	5.27	8.24	
in_telphdirct	Mean	3.21	3.85	1.81	2.98	3.72**
	SD	4.60	5.66	4.34	5.06	
in_facsplz	Mean	13.67	10.14	5.19	9.09	9**
	SD	14.46	11.73	8.53	11.76	
in_crntstd	Mean	1.76	0.58	0.38	0.76	6.06**
	SD	3.75	1.81	1.41	2.30	

Source: HEI Websites Survey
#Degrees of freedom: between groups=2, within groups=220

The first indicator in the Table in_cntctdtl is for contact details of the HEI. The mean and standard deviations of the indicator values for the three categories of HEIs reveal that the Private HEIs have higher mean scores and standard deviation. This indicates poor visibility of contact details on websites of the Private HEIs as compared to the visibility scores for the government funded HEIs. The next indicator in_heiemail is for email address of top functionaries of the HEIs. This indicator is based on the number of clicks required to reach at the email address of any top

functionary (VC/Director or Registrar) of the HEI (whichever available with the minimum number of clicks) and position of the address on the webpage. The mean and standard deviations of the indicator values for the three categories of HEIs reveal that the State HEIs have higher mean scores and standard deviation. This indicates poor visibility of email addresses of top functionary of HEI on the websites of the State HEIs as compared to the visibility scores for the Central and the Private HEIs.

The third indicator presented in the Table in_telphdirct is for telephone directory of the HEIs. The mean and standard deviations of the indicator values for the three categories of HEIs show that the Private HEIs have the lowest mean scores and standard deviation. This indicates the best visibility of telephone directory on websites of the Private HEIs as compared to the visibility scores for the government funded HEIs. One way ANOVA for the indicator and mode of funding is significant as indicated by the value of the F-statistic. This establishes statistical difference between the mean values of the indicator among the three categories of HEIs. Bonferroni decomposition shows significant differences between mean values of the indicator for State and Private HEIs.

The fourth indicator in the Table is in_facsplz. This is for the area of specialisation of faculty. The mean and standard deviations of the indicator values for the three categories of HEIs show that the Private HEIs have the lowest mean scores and standard deviation for this indicator also. This indicates the best visibility of area of specialisation of faculty on websites of the Private HEIs as compared to the visibility scores for the government funded HEIs. One way ANOVA for the indicator and mode of funding is significant as indicated by the value of the F-statistic. This establishes statistical difference between the mean values of the indicator among the three categories of HEIs. Bonferroni decomposition shows significant differences between mean values of the indicator for Central and Private HEIs, and State and Private HEIs.

The Private HEIs have the lowest mean and standard deviation for the fifth indicator also. This indicator is for current students. This indicator is based on the number of clicks required to reach at the links or contents useful for the current students of the HEI. The links or contents useful for the current students are syllabus, courses or programme, class schedule, examination details etcetera. The indicator uses the minimum number of clicks needed to reach at any one of these links or contents or specific link leading to current students. One way ANOVA for the

indicator and mode of funding is significant as indicated by the value of the F-statistic. This establishes statistical difference between the mean values of the indicator among the three categories of HEIs. Bonferroni decomposition shows significant differences between mean values of the indicator for Central and Private HEIs, and Central and State HEIs.

The Table establishes the differences in visibility scores of indicators presented according to mode of funding of the HEIs. Among the five indicators, the indicator for current students has the lowest score and that for the area of specialisation of faculty has the highest score. Thus, the links or contents related to current students are comparatively easily visible or accessible while that for the area of specialisation of faculty is lower.

Table-5.18 presents indicators related to contents analysed in Table-5K above. As images of students, faculty and top functionaries of HEIs are displayed, the indicators to reach at them or to ascertain their area of specialisation and obtain needed information helps in understanding the accessibility to information related to the contents. Table-5.19 is going to represent the indicators for some of the contents analysed in Table-5.12 and 5.13.

The first indicator is for information related to local city. The Sate HEIs have the lowest mean and standard deviation of the scores. The private HEIs have better visibility scores than the Central HEIs. The results are in sync with those obtained from the content analysis of images in Table-5.12. For the second indicator which is for library, the Central HEIs have the highest mean and standard deviation indicating the lowest visibility as compared to other two categories of the HEIs. The Private HEIs are slightly better than the State funded HEIs considering the mean value of the scores. This result is also in sync with that of the Table-5.12. The third indicator is for rank or quality and the State HEIs have the lowest mean and standard deviation indicating better visibility than the other two categories of HEIs. In Table-5.13, the Private HEIs were found to use the dynamic contents and images to the most to display rank or quality related information.

The next two indicators denote international interlinkages through Memorandum of Understanding (MoUs) and collaboration, and by the presence of international or non-residential Indian students respectively. The State HEIs have the lowest mean but highest standard deviations for these two indicators. The private HEIs have the highest mean for these two indicators whereas it was found that the

Private HEIs utilize the dynamic contents and images to display international linkages the most. The next indicator is for research output. Here, the three categories of HEIs are quite close while the State HEIs have the lowest mean. In Table-5.13, it was found that the Central HEIs display their research output through dynamic images more as compared to the other two categories of HEIs. The next four indicators are for online facilities- library catalogue, login facility to library catalogue, login to courses (to access online content related to courses) and email facility hosted by the HEIs. Among these indicators, one way ANOVA is significant for the first one, online library catalogue. The Private HEIs have the lowest values for mean and standard deviation indicating better visibility as compared to the government funded HEIs. Bonferroni decomposition shows that the mean value scores of Central and State, and Central and Private HEIs are significantly different. The Private HEIs also have better visibility scores for login to library catalogue. The Central HEIs do not have links to login to courses. The State HEIs have the lowest mean value of visibility score for email facility. The results from Table-5.13 have shown the State HEIs utilizing flash messages to highlight e-facilities more as compared to the other two categories of HEIs.

Table-5.19: Indicators for Quality and (E-)Facilities						
Indicators	**Central Tendency**	**Central (N=47)**	**State (N=95)**	**Private (N=81)**	**Total (N=223)**	**F-Statistic**
in_lclcity	Mean	2.23	1.22	1.51	1.54	1.31
	SD	4.94	2.95	3.13	3.52	
in_libr	Mean	4.96	3.82	3.72	4.02	0.68
	SD	7.05	4.80	7.13	6.21	
in_rnkqul	Mean	1.77	1.00	1.78	1.44	1.92
	SD	3.74	2.27	3.04	2.93	
in_mouintclb	Mean	2.11	1.86	2.66	2.20	0.68
	SD	3.47	5.18	4.29	4.54	
in_nriintstds	Mean	1.47	1.26	1.64	1.44	0.2
	SD	3.73	4.54	3.33	3.95	
in_rerschotpt	Mean	2.68	2.19	2.61	2.45	0.39
	SD	3.23	3.56	4.16	3.72	
in_libcatlg	Mean	4.61	2.29	1.11	2.35	7.58**
	SD	6.68	5.15	3.03	5.04	
in_libcatlglogin	Mean	0.78	1.84	0.47	1.12	2.25
	SD	2.78	6.21	2.20	4.48	
in_corslogin	Mean	0.00	0.06	0.09	0.06	0.46
	SD	0.00	0.43	0.67	0.49	
in_emailfclt	Mean	5.28	3.61	3.76	4.02	2.22
	SD	3.79	4.62	5.09	4.67	

Source: HEI Websites Survey
#Degrees of freedom: between groups=2, within groups=220

Thus, the comparison of content analysis of images and dynamic contents with visibility indicators reveal that the purpose for utilising images and dynamic contents is to catch the attention of the visitor while the purpose of links and contents thereof is to provide details along. It is a fact that the placement of links or contents depending upon the number of clicks required to reach at them determines their visibility but the objective appears to provide information (in detail) through these links or contents. While the goal of images-static and dynamic is to provide signals, they might also lead the visitor to links or contents if the images display links or contents themselves. Dynamic contents help to highlight links and contents which are otherwise placed in comparatively lesser visible areas of web-pages such as the case of calendar of events and institutional news. So, the HEIs have different tools at their disposal to arrange information on websites in such a manner that some information will be easily accessible and some will be difficult to locate and some will not be available at all. There is possibility of some interrelationship between these tools to arrange information or among different links, contents and images. These interrelationships might also vary according to the goals and objectives of the HEIs. The goals and objectives of the HEIs might depend upon their backgrounds of financing, location, courses they offer and kind of institution they are.

5.4 Interrelationships among Contents as Determinants

In the above sections, significant statistical association between contents have emerged. These statistical associations provide background for exploring determinants of key sets of information important for students. The determinants so explored will help in predicting availability of these key contents with the help of availability of the determinants. This section seeks to understand interrelationships among contents in the form of causal relationships. The section would present the factors determining the presence of three very important variables for students related to the HEIs-

i)   Quality and Rank of HEIs

ii)   Research Output

iii) Forms of Admission

5.4.1 Quality or Rank of HEIs

Here, the dependent variable is lrnkqul such that lrnkqul=1 when information related to rank or quality of HEI is available on website and lrnkqul=0 when the information is not available

lrnkqul is a binary variable created from the variable RNK_QUL

Table-5.20: Rank or Quality (RNK_QUL)

Rank or Quality of HEI	Freq.	Percent	Cum.
Homepage		61	27.35	27.35
One click from homepage		14	6.28	33.63
Three clicks from homepage		2	0.90	34.53
Not Available		146	65.47	100.00
Total		223	100.00	

As the variable RNK_QUL is not distributed normally, logistic regression is preferred to probit with lrnkqul as binary outcome.

Thus, the dependent variable takes the form logit{ p(lrnkqul)/1- p(lrnkqul)}, where p(lrnkqul) is the probability of occurrence of lrnkqul. The denominator {1- p(lrnkqul)} denotes the probability of non-occurrence of lrnkqul.

Proposed model

logit{ p(lrnkqul)/1- p(lrnkqul)}= f(i.Region, i.Deemed Uni, in_abthei, in_nriintstds, i. cvfac, in_plcmntemp, in_eocell, in_telephdirct, in_authrwebst, in_comnt, i. heiaffcol, i. CS_SKC, in_wbcurtupdt, in_whatsnew, in_smrss, in_mouintclb, i.MoF, in_alum)

where

Region is a dummy variable (indicated by i) for location of HEI. The variable is coded as 1=North, 2=West, 3=South, 4=East

DeemedUni is a dummy variable (indicated by i) indicating HEI as a deemed to be university when DeemedUni=1 and 0 otherwise

in_abthei is visibility score indicator for link/content related to "about HEI". This link/content provides introduction to the HEI. The indicator is calculated using the

number of clicks required to reach at the link/content, position of the link/content on the webpage and number of folds of the homepage.

in_nriintstds is the visibility score indicator for the presence of international or non-residential Indian students.

cvfac is a dummy variable (indicated by i) for curriculum vitae of faculty and indicates availability when cvfac=1 and 0 when not available

in_plcmntemp is is the visibility score indicator for link/content related to placement history and employment assistance

in_eocell is the visibility score indicator for link/content related to equal opportunity office

in_telephdirct is the visibility score indicator for link/content related to telephone directory

in_authrwebst is the visibility score indicator for link/content related to authorship of website

in_comnt is the visibility score indicator for link/content related to community in general

heiaffcol is a dummy variable (indicated by i) for HEIs having affiliated colleges. The values are 1 when HEI has affiliated colleges and 0 otherwise

CS_SKC is a dummy variable (indicated by i) for courses on skill development, coded as CS_SKC=1 when offered and 0 otherwise

in_wbcurtupdt is the visibility score indicator for link/content related to updatedness or currentness of the website

in_whatsnew is the visibility score indicator for link/content related to *whatsnew,* link leading to latest information avialbale on the website

in_smrss is the visibility score indicator for link/content related to presence of HEI on social media and RSS feeds available on website

in_mouintclb is the visibility score indicator for link/content related to MoUs and International collaborations

MoF is a dummy variable (indicated by i) for mode of funding of the HEIs coded as 1=Central, 2=State and 3=Private

in_alum is the visibility score indicator for link/content related to alumni of the HEI

Initial iterations of the proposed model are presented in Appendix-V. The independent variables consistently significant were retained and those not significant and consistent were dropped. The next set of iterations is as follows-

Table-5.20.2: Logistic regression with lrnkqul

VARIABLES	(1)	(2)	(3)	(4)	(5)
2.Region	-0.894*				
	(0.505)				
3.Region	-0.935*				
	(0.523)				
4.Region	-2.113***				
	(0.635)				
1.DeemedUni	2.105***	2.081***	2.093***	2.162***	2.140***
	(0.494)	(0.493)	(0.487)	(0.484)	(0.480)
in_abthei	0.214**	0.211**	0.238**	0.227**	0.243**
	(0.106)	(0.102)	(0.111)	(0.0962)	(0.106)
in_nriintstds	0.235***	0.222***	0.228***	0.189***	0.202***
	(0.0656)	(0.0609)	(0.0578)	(0.0486)	(0.0473)
1.cvfac	0.942**	0.999**	1.063***	0.987**	1.028***
	(0.414)	(0.406)	(0.401)	(0.398)	(0.391)
in_plcmntemp	0.146**	0.146***	0.161***	0.181***	0.192***
	(0.0573)	(0.0548)	(0.0545)	(0.0522)	(0.0520)
in_eocell	-0.528**	-0.498**	-0.509**	-0.377**	-0.316**
	(0.258)	(0.245)	(0.215)	(0.153)	(0.147)
in_telphdirct	0.109**	0.0944**	0.0979**	0.0669*	
	(0.0479)	(0.0438)	(0.0418)	(0.0375)	
in_authrwebst	-0.117***	-0.106***	-0.0961***	-0.117***	-0.0956***
	(0.0374)	(0.0368)	(0.0347)	(0.0332)	(0.0292)
in_comnt	-0.151	-0.136*	-0.145**		
	(0.0983)	(0.0816)	(0.0704)		
1.heiaffcol	1.017**	0.941**	0.982**	1.094***	1.245***

	(0.421)	(0.409)	(0.417)	(0.414)	(0.407)
1.CS_SKC	-1.128**	-1.089**	-1.038**	-0.992**	-1.021**
	(0.488)	(0.472)	(0.470)	(0.465)	(0.471)
in_alum	0.0920	0.0850			
	(0.0569)	(0.0575)			
1.EastIn		-1.446***	-1.515***	-1.587***	-1.517***
		(0.527)	(0.528)	(0.532)	(0.541)
Constant	-0.798	-1.472**	-1.507**	-1.411**	-1.535**
	(0.708)	(0.658)	(0.660)	(0.633)	(0.635)
Observations	223	223	223	223	223

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In the above Table, dummy variable for the eastern region EastIn replaces Region as West and South are not found consistently significant. The iteration 5 of Table-5.20.2 is the model with significant predictors which are adequately specified. The model confirms the linktest which helps in detecting specification error, if any[86]. The results of the linktest are presented in Appendix-V. The model is tested for the Private and Government funded institutions (Central and State together) separately. These results are also presented in the Appendix-V. The results can be explained as follows.

The logistic model takes the form-

logit (lrnkqul)= -1.535 -1.517EastIn -1.021CS_SKC+ 1.245heiaffcol -0.956 in_authrwebst -0.316 in_eocell +0.192 in_plcmntemp +1.028 cvfac +0.202 in_nriintstds+0.243 in_abthei + 2.14 DeemedUni

(i)   EastIn: The co-efficient of the parameter is negative. So, it suggests that if an HEI located in the eastern region of the country, a decrease in the log-odds of the dependent variable by 1.517 can be expected as compared to institutions located in other parts of the country.

(ii)   CS_SKC: The co-efficient of the parameter is negative. So, it suggests that if an HEI offers courses related to skill development (and mentions them on websites), a decrease in the log-odds of the dependent variable is expected by 1.021 as compared to other HEIs not offering such courses.

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[86] As statistical software Stata is used for data analysis, linktest is used for detecting specification error.

(iii) heiaffcol: The co-efficient of the parameter is positive. So, it suggests that if an HEI has affiliated colleges mentioned on websites, an increase in the log-odds of the dependent variable is expected by 1.245 as compared to other HEIs not mentioning such information on websites.

(iv) in_authrwebst: The co-efficient of the parameter is negative. So, it suggests that as the value of the indicator for authorship of website increases a decrease in the log-odds of the dependent variable is expected by 0.956. It is to be noted here that larger values of the indicator indicate lesser visibility of link, so relationship is positive with the visibility of the link.

(v) in_eocell: The co-efficient of the parameter is negative. So, it suggests that as the value of the indicator for equal opportunity office or cell at HEI increases a decrease in the log-odds of the dependent variable is expected by 0.316. As mentioned above, larger values of the indicator indicate lesser visibility of link, so relationship is positive with the visibility of the link.

(vi) in_plcmntemp: The co-efficient of the parameter is positive. So, it suggests that as the value of the indicator for placement and employment history of students increases an increase in the log-odds of the dependent variable is expected by 0.192. The relationship between the dependent variable and the link for placement appears negative as the strategy might be to highlight rank or quality of HEI if the information on placement history has to be made less visible.

(vii) cvfac: The co-efficient of the parameter is positive. So, it suggests that if an HEI displays curriculum vitae of faculty on websites, an increase in the log-odds of the dependent variable by 1.028 can be expected as compared to HEIs not providing such information. Thus, curriculum vitae of faculty appear as one of the components of displaying rank or quality of HE.

(viii) in_nriintstds: The co-efficient of the parameter is positive. So, it suggests that as the value of the indicator for non-residential Indian (NRI) students

or international students on website increases an increase in the log-odds of the dependent variable is expected by 0.202. It implies that HEIs might use information on non-residential Indian students or international students as a strategy to signal their quality even if they do not provide direct information on rank or quality.

(ix)   in_abthei: The co-efficient of the parameter is positive. So, it suggests that as the value of the indicator for 'about HEI' on website increases an increase in the log-odds of the dependent variable is expected by 0.243. It implies that HEIs might use information their 'about HEI' link as a strategy to signal their quality even if there is no direct link for rank or quality.

(x)   DeemedUni: The co-efficient of the parameter is positive. So, it suggests that if an HEI happens to be a deemed to be a university an increase in the log-odds of the dependent variable by 2.14 can be expected as compared to other HEIs. Deemed to be Universities are granted degree awarding rights for specific areas of study. Being small and focussed, they tend to attract students more than other HEIs through displaying information on rank and quality.

The above model provides predictors for availability of information related to rank or quality on websites of HEIs. The predictors can be grouped into location of HEIs (located in the eastern part), kind of HEIs (deemed to be universities and universities with affiliated colleges), courses offered (skill development), indicators for fair treatment (equal opportunity cell), authenticity (authorship of websites), quality (curriculum vitae of faculty, placement information), peer group (NRI and International students) and details of HEI (About Us link).

5.4.2 Research at HEIs

After finding out the factors for rank or quality of HEIs, this sub-section looks into research at HEIs. Research is not only a component of quality, it helps in understanding the processes undergoing at HEIs-their goals and objectives. Higher Education ideally represents a synthesis of teaching and research. While rank or

quality indicates overall projection of HEIs as academic institutions, research activities render completeness to a degree awarding institution.

Table- 5.21: Contents of Research Output on Websites of HEIs					
Contents	Central (N=47)	State (N=95)	Private (N=81)	Total (N=223)	Pearson's Chi-Square
Publications	25.53	13.68	27.16	21.08	5.48*
Projects/Consultancy	36.17	22.11	23.46	25.56	3.56
Journals Published by HEIs, Workshop organised	6.38	1.05	0.00	1.79	7.39**
Research Centres/Areas	4.26	8.42	2.47	5.38	3.19
Awards/Grants/Chairs	17.02	7.37	3.70	8.07	7.22**
Research Facilities	8.51	7.37	2.47	5.83	2.69
PhDs awarded	0.00	2.11	0.00	0.90	2.71
Collaborations/Outreach	12.77	7.37	4.94	7.62	2.60
Intellectual Property Rights (IPR)	14.89	7.37	4.94	8.07	4.08

Source: HEI Websites Survey
#Degrees of freedom=2

Table-5.21 shows that the HEIs showcase research through publications and projects or consultancy they are carry out. The Central HEIs are found to be engaged in projects or consultancy more as compared to their peers from State funded and Private sector. The Private HEIs show publications on their websites more than their peers from the government sector. The State HEIs trail the other two categories of HEIs in providing information on these contents related to research while they perform better than the Private HEIs for other contents. The Central HEIs are found to provide information on research activities such as journals published by them and workshops organised, and awards, grants and chairs instituted at their institutions. Pearson's Chi-Square is significant for these contents indicating the non-independence from mode of funding. A small number of State HEIs have been found to show PhD degrees awarded by them as contents of research.

Logistic Model

Here, the dependent variable is lresearch such that lresearch =1 when information related to rank or quality of HEI is available on website and lresearch =0 when the information is not available

The variable lresearch is created from RESRCH_OTPT. Since the variable RESRCH_OTPT

Is not distributed normally, logistic regression is preferred to probit with lresearch as a binary outcome.

Table-5.21.1: Research Output (RESRCH_OTPT)

Research Output	Freq.	Percent	Cum.
Homepage	90	40.36	40.36
One click from homepage	14	6.28	46.64
Two clicks from homepage	6	2.69	49.33
Three clicks from homepage	4	1.79	51.12
Five clicks from homepage	1	0.45	51.57
Not Available	108	48.43	100.00
Total		223	100.00

Thus, the dependent variable takes the form logit $\{ p(lresearch)/1-p(lresearch)\}$, where p(lresearch) is the probability of occurrence of lresearch. The denominator $\{1- p(lresearch)\}$ denotes the probability of non-occurrence of lresearch.

Proposed Model

Logit $\{ p(lresearch)/1- p(lresearch)\}$=f{i. Region, i. MoF, age_hei, lhppf, in_alum, in_sitesrch, in_persrch, in_atozlink, in_sitemap, in_facsplz, i.CS_LNI, i.CS_MGT, i.CS_SST, i.CS_SCT i.CS_ENG i. CS_SCA)

where

Region is a dummy variable (indicated by i) for location of HEI. The variable is coded as 1=North, 2=West, 3=South, 4=East

MoF is a dummy variable (indicated by i) for mode of funding of the HEIs coded as 1=Central, 2=State and 3=Private

age_hei is age of HEIs by the end of 2016

lhppf if number of links on homepage per fold, it is obtained by dividing the total number of links on homepage by the number of folds

in_alum is the visibility score indicator for link/content related to alumni of the HEI

in_sitesrch is the visibility score indicator for link/content related to sitesearch feature available on websites of HEIs

in_persrch is the visibility score indicator for link/content related to features available on websites of HEIs, helping in searching a person feature

in_atozlink is the visibility score indicator for link/content related to features a to z link , which list all links alphabetically for the visitor

in_sitemap is the visibility score indicator for link/content related to site map feature available on websites of HEIs

in_facsplz is the visibility score indicator for link/content related to area of specialization of faculty

CS_LNI, CS_MGT, CS_SST, CS_SCT CS_ENG CS_SCA are dummy variables (indicated by i) for courses on Indian Languages (any), Management, Social Sciences (traditional), Sciences (traditional), English and Sciences (Applied) offered by the HEIs. The variables are coded as 1=offered and 0 otherwise. Here, traditional refers to basic or non-applied to distinguish them from applied courses.

	(1)	(2)	(3)	(4)
Table-5.21.2: Logistic regression with lresearch as dependent variable				
VARIABLES	lresearch	lresearch	lresearch	lresearch
age_hei	0.0170*	0.0167*	0.0185**	0.0181**
	(0.00916)	(0.00901)	(0.00871)	(0.00852)
Lhppf	0.0303***	0.0301***	0.0294***	0.0306***
	(0.0112)	(0.0112)	(0.0111)	(0.0111)
in_alum	0.163***	0.164***	0.165***	0.154***
	(0.0506)	(0.0505)	(0.0511)	(0.0496)
in_sitesrch	0.105**	0.108**	0.109**	0.106**
	(0.0442)	(0.0445)	(0.0452)	(0.0451)
in_sitemap	-0.0343	-0.0353	-0.0343	
	(0.0267)	(0.0267)	(0.0275)	
in_facsplz	0.0348**	0.0364**	0.0357**	0.0321**
	(0.0152)	(0.0153)	(0.0153)	(0.0149)
1.CS_MGT	1.004***	0.966***	0.935***	0.952***
	(0.364)	(0.355)	(0.350)	(0.350)
1.CS_SST	-0.426	-0.494		
	(0.429)	(0.427)		
1.CS_SCT	-0.282			
	(0.351)			
1.CS_LNI	1.757***	1.673***	1.378***	1.357***
	(0.450)	(0.431)	(0.382)	(0.381)
Constant	-3.250***	-3.285***	-3.408***	-3.482***
	(0.602)	(0.601)	(0.580)	(0.573)
Observations	223	223	223	223

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The iteration 5 of Table-5.20.2 is the model with significant predictors which are adequately specified. The results of the linktest are presented in the Appendix-V. The model is iterated for the three categories of HEIs separately and the Government funded institutions (Central and State together). The iterations are presented in the Appendix-V. The results can be interpreted as follows-

The model takes the form-

Logit (lresearch)= -3.482 +0.952 CS_MGT+1.357 CS_LNI-0.0997 in_rti +0.0321 in_facsplz +0.106 in_sitesrch +0.154 in_alum +0.0306 Lhppf+0.0181 age_hei

(i) CS_MGT: The coefficient of the parameter is positive. This suggests that the log-odds of the dependent variable are expected an increase of 0.952, if the HEIs offers courses on management, other variables kept unchanged.

146

This indicates that HEIs offering management courses are more likely to display their research on websites as compared to other HEIs.

(ii)   CS_LNI: The coefficient of the parameter is positive. This suggests that the log-odds of the dependent variable is expected 1.357 increase if the HEIs offers courses on Indian languages, other variables kept unchanged. This indicates that HEIs offering Indian Languages courses are more likely to display their research. This might due to the fact that the ways of doing research and publication environment for these subjects are different from others. This would require deep investigation for proper understanding.

(iii)   in_rti: The coefficient of the parameter is negative. This suggests that we can expect 0.997 increase in the log-odds of the dependent variable as the value of indicator for RTI decreases. As mentioned above, the higher values of the visibility indicators indicate low visibility. So, the relationship is positive between the visibility of RTI on websites and the link for research.

(iv)   in_facsplz: The coefficient of the parameter is positive. This suggests that we can expect 0.0321 increase in the log-odds of the dependent variable if the value of indicator for faculty specialisation increases. As mentioned above, the indicator measures higher visibility with lower values, the relationship turns to be negative. The implications drawn are that there is tendency by the HEIs to display faculty specialisation and research as substitutes. The websites of HEIs displaying faculty specialisation are less likely to display information on research.

(v)   in_sitesrch : The coefficient of the parameter is positive. This suggests that we can expect 0.106 increase in the log-odds of the dependent variable if the value of indicator for site search link increases. As mentioned above, the relationship appears to be negative as the HEIs providing link for site search on their websites are less likely to provide information on research.

(vi)   in_alum: The coefficient of the parameter is positive. This suggests that we can expect 0.154 increase in the log-odds of the dependent variable if the

value of indicator for aluni increases. As mentioned above, the relationship appears to be negative as the HEIs providing information or link for alumni on their websites are less likely to provide information on research. This also indicates some kind of substitution of contents.

(vii)   Lhppf: The coefficient of the parameter is positive. This suggests that we can expect 0.0306 increase in the log-odds of the dependent variable if per fold number of links on homepage increases, other variables being constant. As observed above in Table- , Central HEIs have comparatively more number of links on homepage per fold, so they are more likely to display information on research on their websites as compared to State and Private HEIs.

(viii)   age_hei: The coefficient of the parameter is positive. This suggests that we can expect 0.0181 increase in the log-odds of the dependent variable if the age of the HEI increases, other variables being constant. As observed above in Table- , Private HEIs are comparatively new so they are less likely to display information on research on their websites.

The predictors provided by the model can be grouped into age of HEIs, design of websites (links on homepage per fold and site search link), courses offered (management and Indian languages), quality (alumni and faculty specialisation) and governance (RTI). The variation of age and number of links on homepage per fold across the three categories of HEIs, discussed above, throw light on behaviour of these HEIs in terms of displaying information on research.

5.4.3 Admission Process

This sub-section seeks to look into the admission process to find out the interrelationships among variables related to admission process, institutional features and links/contents available on websites of HEIs. The dependent variable for the proposed ordered logistic model is

Table-5.22.1: Submission of Admission Application Form

```
          Options    |   Freq.   Percent   Cum.
-------------------------------------------------------------------
         No info/Direct |     68     30.49    30.49
                By Post |     82     36.77    67.26
 Online Submission/Email |     73     32.74   100.00
-------------------------------------------------------------------
                  Total |    223    100.00
```

The variable is coded as No information/Direct=1, indicating admission application to be collected and submitted in person or no information available on website

By Post=2, indicating admission application to be collected and submitted through postal services

Online Submission/Email=3, indicating admission application to be downloaded and emailed back or to be filled online

The variable acts as indicator for two features- (i) the openness of the HEIs towards students according to geographical area and ease of access and (ii) e-governance

Table-5.22.2: Ordered Logistic Model with Submission of Admission Application Form			
VARIABLES	(1) Odds ratio	(2) Odds ratio	(3) Odds ratio
1.AdmAppFees_NB	-0.270 (0.929)		
1.Brochures_Downldable	-1.167*** (0.324)		
in_alum	0.0995** (0.0413)		
in_prosstud	-0.271*** (0.0563)	-0.316*** (0.0579)	-0.313*** (0.0577)
in_rsltexams	-0.0379* (0.0207)		
in_cntctdtl	0.0329 (0.0328)		
in_authrwebst	-0.0670** (0.0271)	-0.0589*** (0.0221)	-0.0572** (0.0222)
in_rnkqul	-0.155*** (0.0436)	-0.172*** (0.0514)	-0.166*** (0.0509)
1.DeemedUni	0.548 (0.359)	0.785** (0.348)	0.843** (0.351)
in_nriintstds	0.128*** (0.0372)	0.180*** (0.0446)	0.178*** (0.0435)
1.AdmAppFees_CC	-3.211***	-3.332***	-3.335***

	(0.995)	(0.560)	(0.549)
1.CS_MGT	-0.834***	-0.817***	-0.873***
	(0.299)	(0.302)	(0.301)
2.Region	-1.050**	-1.062**	
	(0.452)	(0.446)	
3.Region	-0.730*	-0.595	
	(0.402)	(0.401)	
4.Region	-0.583	-0.553	
	(0.446)	(0.430)	
Nbrchrs		0.185***	0.192***
		(0.0492)	(0.0495)
in_heiemail		-0.0460***	-0.0494***
		(0.0129)	(0.0131)
1.WestIn			-0.668**
			(0.334)
Constant cut1	-6.277***	-5.288***	-4.878***
	(0.971)	(0.772)	(0.669)
Constant cut2	-4.039***	-3.082***	-2.699***
	(0.881)	(0.698)	(0.609)
Observations	223	223	223

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The ordered logistic model presented in Table-5.22.1 can be interpreted as follows:

(i)   in_prosstud: The results show ordered log-odds estimate for a one unit increase in the value of the indicator for prospective students on the expected level of the dependent variable, other variables in the model remaining constant. If the value of the indicator increases by one unit, the ordered log-odds of association with higher values of the dependent variable will increase by -0.313, that is, will decrease. As the value of the indicator present higher visibility with lower scores, the association of higher visibility of links for prospective students is positive with higher values of the dependent variable.

(ii)   in_authrwebst: The results show ordered log-odds estimate for a one unit increase in the value of the indicator for authorship of the websites on the expected level of the dependent variable, other variables in the model remaining constant. If the value of the indicator increases by one unit, the ordered log-odds of association with higher values of the dependent variable will increase by -0.0572, that is, will decrease. As the value of the indicator present higher visibility with lower scores, the association of

higher visibility of links for authorship of the websites is positive with higher values of the dependent variable.

(iii) in_rnkqul: The results show ordered log-odds estimate for a one unit increase in the value of the indicator for rank or quality on websites on the expected level of the dependent variable, other variables in the model remaining constant. If the value of the indicator increases by one unit, the ordered log-odds of association with higher values of the dependent variable will increase by -0.166, that is, will decrease. As the value of the indicator present higher visibility with lower scores, the association of higher visibility of links for rank or quality on websites is positive with higher values of the dependent variable.

(iv) DeemedUni: If the HEI happens to be a deemed to be a university, the ordered log-odds of association with higher values of the dependent variable will increase by 0.843 as compared to other HEIs, other variables held constant.

(v) in_nriintstds: The results show ordered log-odds estimate for a one unit increase in the value of the indicator for NRI or International students on websites on the expected level of the dependent variable, other variables in the model remaining constant. If the value of the indicator increases by one unit, the ordered log-odds of association with higher values of the dependent variable will increase by 0.178. As the value of the indicator present higher visibility with lower scores, the association of higher visibility of links for NRI or International students on websites is negative with higher values of the dependent variable. This suggests that HEIs showing openness for NRIs or International students are not much open in their admission process. This also indicates that the target customers of the Indian HEIs are mostly Indian students. This negative association might also be the result of regulatory restrictions on admitting foreign students and dealing in foreign currency.

(vi) AdmAppFees_CC: If the HEI happens to be accepting admission fees through cheque or cash, the ordered log-odds of association with higher

values of the dependent variable will decrease by 3.335 as compared to other HEIs, other variables held constant.

(vii)   Nbrchrs: The ordered log-odds of association with higher values of the dependent variable will increase by 0.192 with one unit increase in the number of clicks required to reach at the brochures, other variables held constant.

(viii)   CS_MGT: If the HEI happens to be offering management courses, the ordered log-odds of association with higher values of the dependent variable will decrease by 0.873 as compared to other HEIs, other variables held constant.

(ix)   in_heiemail: The ordered log-odds of association with higher values of the dependent variable will decrease by 0.0494 with one unit increase in the number of clicks required to reach at the email facility provided by the HEIs, other variables held constant. As the indicators measure higher visibility with lower values, the relationship turns out to be positive.

(x)   WestIn: If the HEI happens to be located in the Western part of the country, the ordered log-odds of association with higher values of the dependent variable will decrease by 0.668 as compared to other HEIs, other variables held constant.

5.5 Regulation of HEIs

This section will present discussion on websites of HEIs as platforms to facilitate day to day management and governance of HEIs. The section will start with use of website of HEIs by present students and then go on to discuss websites as sources and instruments of E-governance and compliance of regulations by HEIs. These utilities of websites stem from their dynamic nature and accessibility. As websites contain several web-pages, availability and ordering of contents on these pages play vital roles in utilisation of websites. Segmentation of websites as suggested by Middleton (1999) and Meyer (2001) makes ordering of information effective from users' perspective. In this section, utility of websites of HEIs for two kinds of users will be analysed. The first category of users is present students of HEIs and the second

category refers to general visitors including prospective students, teachers and vendors.

Uses of websites from the perspectives of prospective students are analysed in the fifth chapter. Here, the discussion would focus on websites as sources of information in terms of smoothening information processing for governance. As one of the uses of websites as virtual notice board is reported above, they can be examined as instruments governance in general and of E-governance in particular.

Websites of HEIs as instruments of Governance

A source of information to be efficiently useful has to meet the needs of the information seekers and also should provide information that even those searching information have not prioritised for seeking. Mere availability of information does not serve the purpose of the seekers rather information needs to be made visible to the visitors. We have discussed the indicator for measuring visibility of contents on websites in the fourth chapter and have utilised the same for analysis in the fifth chapter. The indicators so developed are presented for key contents meant to be useful for current students. Table-5.23 below depicts the indicators and one-way ANNOVA with mode of funding of HEIs as independent variable. As evident from the table-7.5, all indicators except the three towards the down of the Table have significant F-statistic. Though we have found from the students' survey that websites are seldom used for results of examinations, the information related to them are better available on central HEIs as the mean and standard deviation of the indicator are lowest for them. State HEIs do not make it easily visible on their websites.

Table-5.23: Indicators for Current Students						
Indicators	**Central Tendency**	**Central (N=47)**	**State (N=95)**	**Private (N=81)**	**Total (N=223)**	**F-Statistic#**
in_rsltexams						3.82**
	Mean	1.15	4.71	2.15	3.03	
	SD	2.21	11.02	5.73	8.15	
in_telphdirct						3.72**
	Mean	3.21	3.85	1.81	2.98	
	SD	4.60	5.66	4.34	5.06	
in_plcmntemp	Mean	3.47	1.73	4.62	3.15	10.16***
	SD	5.06	3.07	4.97	4.46	
in_notcanno	Mean	3.07	2.73	1.72	2.43	3.57**
	SD	2.30	3.37	2.80	3.13	
in_smrss	Mean	1.16	2.40	5.59	3.30	10.27***
	SD	3.22	6.89	5.89	6.15	
in_crntstd	Mean	1.76	0.58	0.38	0.76	6.06***
	SD	3.75	1.81	1.41	2.30	
in_libcatlg	Mean	4.61	2.29	1.11	2.35	7.58***
	SD	6.68	5.15	3.03	5.04	
in_libcatlglogin	Mean	0.78	1.84	0.47	1.12	2.25
	SD	2.78	6.21	2.20	4.48	
in_corslogin	Mean	0.00	0.06	0.09	0.06	0.46
	SD	0.00	0.43	0.67	0.49	
in_emailfclt	Mean	5.28	3.61	3.76	4.02	2.22
	SD	3.79	4.62	5.09	4.67	

Source: HEI Websites Survey

Notices and Announcements, one of the most used information from websites by current students, are also important from the point of view of governance or management. Indicators for such contents which are very useful for governance are presented in Table-5.24 below.

Indicators	Central Tendency	Central (N=47)	State(N=95)	Private(N=81)	Total(N=223)	F-Statistic#
Table-5.24: Indicators for E-Governance						
in_tndr	Mean	4.37234	4.11579	0.290123	2.780269	28.08***
	SD	3.77	4.98	1.20	4.19	
in_crculr	Mean	1.042553	1.452632	0.50	1.020179	2.32
	SD	2.39	3.51	2.40	2.94	
in_grvncstdun	Mean	2.234043	1.605263	0.611111	1.376682	3.99**
	SD	4.30	3.70	1.81	3.35	
in_eocell	Mean	0.446809	0.757895	0.308642	0.529148	0.97
	SD	1.61	2.95	1.17	2.18	
in_rti	Mean	4.638298	4.489474	1.197531	3.325112	13.73***
	SD	3.95	5.85	2.91	4.84	
in_mndtdiscl	Mean	0.765957	0.126316	1.117284	0.621076	4.62**
	SD	2.74	0.80	2.84	2.22	
in_antragg	Mean	2.574468	2.510526	3.012346	2.706278	0.23
	SD	4.01	5.65	5.08	5.12	

Source: HEI Websites Survey

Right to Information

RTI and Private HEIs

There have been arguments and counter-arguments over whether the private HEIs come under the purview of the Right to Information Act (RTI) or not? Private HEIs which owe their genesis to Act(s) passed in Central or State legislators or enjoy any grant or privileges provided by any public authority come under the purview of the RTI Act. Since private universities in India are established through enactment of Act(s) in State Legislatures, they are "public authorities" in the same way as that of State Universities. They have to comply with all regulations applicable to State Universities in India.

Deemed universities are notified in the official Gazette by the Central government on the advice of the University Grants Commission. This makes them to be categorized as "public authorities" according to Section 2 (h) (d) of the RTI Act 2005. However, there have been instances when this technicality has been ignored or

155

overlooked. One such instance occurred in 2008 when the Rajasthan Information Commission ruled that Jain Vishwa Bharati University, a deemed university, is not a public authority as it is registered under the Societies Registration Act.

The Central Information Commission (CIC) went deeper into the definitions of public authorities and concluded that private deemed universities are declared to be so by notifications in Official Gazette by the Central Government on the advice of the University Grants Commission and hence they fall under the category of "public authorities". The CIC in its decision in 2009 regarding an appeal against NMIMS University ruled out the above mentioned decision of the Rajasthan Information Commission produced as an argument by the NMIMS counsel. The CIC maintained the same position in its ruling in 2010 regarding an appeal against Manipal University.

The controversy which seemed to have been settled was refuelled by the Prime Minister's Office (PMO) in 2013 in its response to an RTI query filed by the Indian Council of Universities. The PMO, ignoring the decisions of the CIC, stated that the private HEIs –universities and deemed universities are not covered under the RTI Act. There are several such cases still pending with the CIC.

Determinants of visibility of RTI on Website

The discussion above indicates the reluctance of HEIs, especially Private HEIs, to follow the RTI Act in principle. It seems essential to find out other determinants affecting the adherence to the RTI by the HEIs other than their mode of funding. The model proposed is described below.

Table: 5.25 Lrtiavl (availability of RTI link on website)

	Freq.	Percent	Cum.
Not Available	94	42.15	42.15
Available	129	57.85	100.00
Total	223	100.00	

Logistic model

logit (ltriavl)= f {i. MoF, i. heiaffcol, in_tndr, in_eocell, in_sitesrch, in_persrch, in_hstl, in_corsprog, in_nriinstds)

The variables of the proposed model have been introduced in discussion above.

Table: 5.26 Logistic model of RTI			
VARIABLES	(1) lrtiavl	(2) lrtiavl	(3) Lrtiavl
2.MoF	-2.321***	-2.215***	-2.055***
	(0.703)	(0.669)	(0.605)
3.MoF	-3.702***	-3.638***	-3.531***
	(0.651)	(0.635)	(0.587)
1.heiaffcol	1.158***	1.166***	1.189***
	(0.413)	(0.415)	(0.417)
in_tndr	0.218***	0.212**	0.203**
	(0.0800)	(0.0831)	(0.0814)
in_eocell	0.257**	0.249**	0.248**
	(0.119)	(0.108)	(0.110)
in_sitesrch	0.159***	0.148***	0.132***
	(0.0584)	(0.0556)	(0.0508)
in_persrch	-0.278**	-0.261**	-0.236**
	(0.118)	(0.116)	(0.110)
in_hstl	-0.0635**	-0.0705**	-0.0753**
	(0.0310)	(0.0326)	(0.0320)
in_corsprog	-0.0822*	-0.0904**	
	(0.0425)	(0.0459)	
in_nriintstds	-0.0797*		
	(0.0421)		
Constant	2.036***	1.953***	1.592***
	(0.612)	(0.598)	(0.482)
Observations	223	223	223

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Linktest model is presented in Appendix-V

The model takes the form-

Logit (lrtiavl)= 1.592 -0.0753 in_hstl -0.236 in_persrch +0.248 in_eocell + 0.203 in_tndr +1.189 heiaffcol -3.531 MoF(3)- 2.055 MoF(2)

(i)   In_hstl: The coefficient of the parameter is negative indicating 0.0753 decrease in log-odds of the dependent variable with increase in the value of the indicator for hostel facilities other variables remaining constant. As the value of the indicator measures higher visibility with lower values, the relationship turns out to be positive. Thus, HEIs providing information on hostel facilities for students are more likely to provide information on the RTI.

157

(ii)   in_persrch: The coefficient of the parameter is negative indicating 0.236 decrease in log-odds of the dependent variable with increase in the value of the indicator for link for person search on websites, other variables remaining constant. As the value of the indicator measures higher visibility with lower values, the relationship turns out to be positive. Thus, HEIs providing link for person search on websites are more likely to provide information on the RTI.

(iii)   in_eocell: The coefficient of the parameter is positive indicating 0.248 increase in log-odds of the dependent variable with increase in the value of the indicator for link for person search on websites, other variables remaining constant. As the value of the indicator measures higher visibility with lower values, the relationship turns out to be negative. Thus, HEIs providing link for equal opportunity cell or office on websites are less likely to provide information on the RTI.

(iv)   in_tndr: The coefficient of the parameter is positive indicating 0.203 increase in log-odds of the dependent variable with increase in the value of the indicator for link for person search on websites, other variables remaining constant. As the value of the indicator measures higher visibility with lower values, the relationship turns out to be negative. Thus, HEIs providing link for tenders on websites are less likely to provide information on the RTI. The two governance related links- equal opportunity office and tenders being negatively associated with link for the RTI indicate some kind of substitution between contents whereby following one regulation is stressed to non-adherence of the other.

(v)   heiaffcol: The coefficient of the parameter is positive indicating 1.189 increase in log-odds of the dependent variable if the HEI happens to be having affiliated colleges, other variables remaining constant. Thus, universities with affiliated colleges are more likely to display links related to the RTI on their websites.

(vi)　MoF(2): The variable stands for State HEIs. The coefficient for the parameter is negative indicating a 2.055 decrease in the log-odds of the dependent variable if the HEI happens to be State funded.

(vii)　MoF(3): The variable stands for Private HEIs. The coefficient for the parameter is negative indicating a 3.531 decrease in the log-odds of the dependent variable if the HEI happens to be private.

The results show that HEIs tend to scuttle the RTI by following other prescriptions for governance such as displaying tenders and information related to equal opportunity office on their websites. Except Central HEIs, all others are more likely to violate the mandatory displaying of information related to the RTI. Universities with affiliated colleges are more likely to follow the Act. HEIs information related to hostels and person search links are also more likely to display information related to the RTI on their websites.

5.6 Summary of Findings

Crucial differences have been observed among Central, State and Private HEIs in terms of structure of websites, presentation of contents and signalling. Only 35.8 percent Private HEIs use URL ending with .ac.in. The choice of URLs by the HEIs is not independent of their mode of funding. Language of websites indicates homonisation. Central HEIs appear to be more inclusive as they provide options for full/partial translation. The Central HEIs use most of the space of their homepages for links while the Private HEIs leave most of the space of their homepages to be used for other contents such as rotating contents and pictures. This indicates the intensive use of folds for displaying pictures-static and dynamic by the private HEIs. Due to the established reputation of the older Central HEIs, they do not feel the need to display external linkages for credibility. Central HEIs have the highest visibility of authorship and currentness or currency of information on their websites. Displaying events except convocation is dependent on mode of financing of HEIs. While the government funded HEIs showcase participation of dignitaries their private counterparts prefer to display their fondness to celebrities to attract young students. The Private HEIs display laboratory and library more often as compared to their government funded peers to attract the attention of the visitors. Most Private HEIs

display information relevant for students through images. Display of rank or quality on websites is logistically related to region, skill development courses, author of website indicator, and indicator for CV of faculty. Display of research carried out at HEIs is logistically related to indicators for site-search, age of HEI, faculty specialisation, alumni, number of links per fold, management and Indian languages courses offered at HEIs. Submission of Admission form acts as proxy for level of E-governance at HEI. It has significant associations with indicators for prospective students, email facility at HEI, application fees to be submitted through cash, link for NRI or international students and management courses offered at HEIs. Central HEIs also follow the RTI as they do with language policies of the Union Government.

Chapter 6

Information processing and Choice by students in Higher Education

6.1 Introduction

The preceding chapter presented discussion on websites of HEIs as sources of information and representation of HEIs in the virtual world. Ordering of information on websites, as signalling devices, has been studied as the websites of HEIs cater to users or visitors-the students for information processing, with respect to their objectives. This present chapter will deal with the linkages between the sources of information, the users and the underlying information processing thereof. This seeks to answer research questions six to eleven related to choice and decision making, based on analysis of data collected through online questionnaire survey of students of HE. It will try to understand the process of choice and decision making with respect to HE, which includes search of information, utilisation of information and perceptions of student choices with respect to experiences in the HEIs. The chapter is divided into six sections. The first section presents profile and background of the respondents and tries to add to the description of sample presented in the fourth chapter. The second section analyses information seeking experiences of the students with respect to their characteristics and sources. The Third section would present analysis of choice and decision making.

6.2 Background of the respondents:

Chapman (1981) stressed to take note of individual characteristics of students along with their background to understand their choices at the HE level. Becker (1964) and Swell & Shah (1978) also mentioned the interaction of students' characteristics with their background variables in influencing their choice. Understanding of background of students is expected to help their information processing for choice of HE. Apart from the description of sample, presented in the fourth chapter; socio-economic and academic background of the respondents are also important for understanding their information seeking and choice. This section will include enrolment of students at various levels of HE, their family background in terms of income and computer-

literacy and academic aptitude of students as gauged by their marks obtained in examinations.

Enrolment in Degree Programmes

Students in HE can be categorised into three levels of enrolments-under graduation (UG), post-graduation (PG) and research (M.Phil and PhD/D.Phil) [87]. The enrolment of respondents across different levels is presented in Table-6.1, which shows that 38 per cent respondents are enrolled for research programmes and 33 per cent are enrolled for undergraduate courses [88]. The proportion of female respondents is more than their male counterparts in the research programmes. Discipline wise enrolment is depicted in Tables- 6.A.1 and 6.A.2 (please see Appendix-VI). Table-6.A.1 shows enrolments in disciplines and areas related to humanities and social sciences whereas Table-6.A.2 shows the same for science and technology, and disciplines and areas which can be grouped as applied areas of study.

Table-6.1: Enrolment in Degree Programmes			
Course(s)	Male	Female	Total
Under Graduate	33.77	32.69	33.22
Post Graduate	29.14	23.72	26.38
Research Programmes	34.44	41.03	37.79
No Response	2.65	2.56	2.61
Total	100	100	100

Source: Students' Survey

Table-6.2 below depicts various engagements of the respondents before they joined their present courses. Most of the respondents are found to be continuing students as 66.45 per cent of them were enrolled in their previous courses, just before joining the present ones, 15.31 per cent of respondents were employed and 9.77 per cent were preparing for competitive and professional examinations before they enrolled for their present courses [89]. The Table-6.2 shows that study break between

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[87] M.Phil and Ph.D/D.Phil refer to Master of Philosophy and Doctor/Doctorate of Philosophy respectively

[88] As per All India Survey on Higher Education (2015-16), 79.3 percent students are enrolled at UG level (mostly in colleges) and only 0.4 percent at the research level. This study sought to focus on degree awarding HEIs so the proportion of students enrolled at the three levels is comparable.

[89] Competitive examinations refer to examinations conducted by various agencies for recruitment. Agencies such as Union Public Service Examination, State Public Service Commissions, and Staff

two courses is quite uncommon. Preparation for competitive and professional examinations and employment are a commonplace than study breaks (not engaged in anything). Most of the students continue their education without any break. The engagements of students before joining a particular course might influence their perspectives and access to different sources of information. For example, students joining a course after a stint at job might have different world view and expectations from the course and the HEI than their peers who have been studying without any break. The decision to go for study-breaks, getting employed in between two courses , and opportunities to take time to prepare for competitive and professional examinations are not only matters of choice but might also be influenced by financial resources at hand. The decisions may also vary for boys and girls. Students require support from families to sustain themselves during these periods unless they take up some job. So, such decisions are often supported by family income of the students.

| Table-6.2: Engagements of respondents before the present course of study			
Engagements	Male	Female	Total
Study-break	7.28	4.49	5.86
Preparing for Professional Examinations	10.6	8.97	9.77
Pursuing previous course	64.24	68.59	66.45
Employed	15.89	14.74	15.31
No Response	1.99	3.21	2.61
Total	100	100	100

Source: Students' Survey

Family Income

Figure-6.1 below presents distribution of monthly family income of the respondents. Number of students and their monthly family income (in thousands of Indian currency) are plotted along the vertical and the horizontal axes respectively. Male students come from comparatively poor families than female students. This might be

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Selection Commissions etcetera conduct such examinations for recruitment for different kinds of jobs ranging from civil services to supporting staff at various levels. Professional examinations refer to entrance tests to professional courses such as Engineering and Medical etcetera. Similar to competitive examinations, there are agencies to conduct such professional examinations at All-India level and at the level of States. Some HEIs conduct their own entrance tests.

due to the fact that comparatively well off households encourage their daughters for HE, while female students coming from humble backgrounds find it difficult to reach at the levels of HE. The enrolment of female students is more than male students at the Research level. A cross-tabulation of family income of students with levels of enrolment (presented in Table-6.A.3 in Appendix-VI) shows most of enrolment at the PG and Research level coming from 15-30 and 30-50 thousands per month income background. Considering these two results together, the graph of family income of female students, which is seen rising initially and then falling, can be understood clearly.

Figure-6.1: Monthly Family Income of the Respondents (percentage)
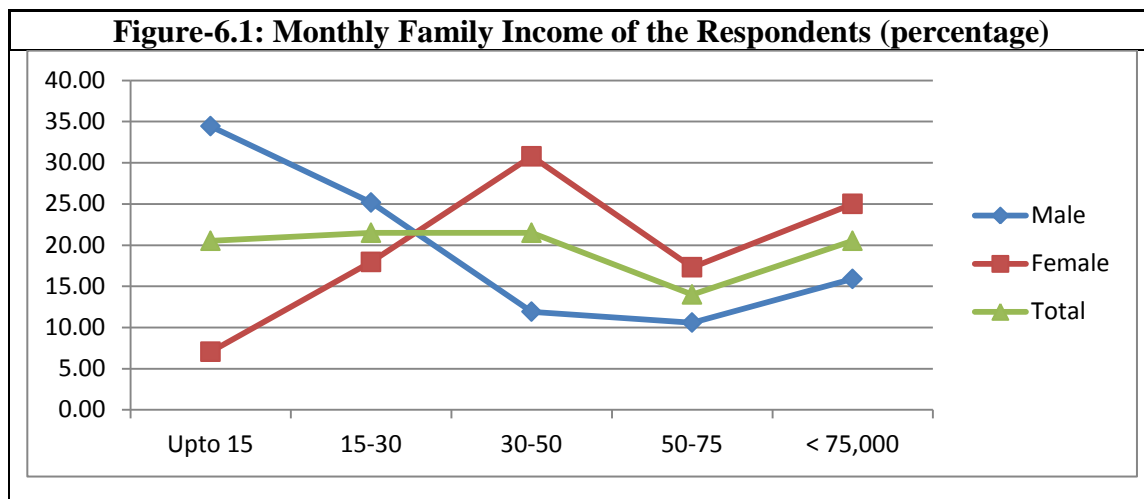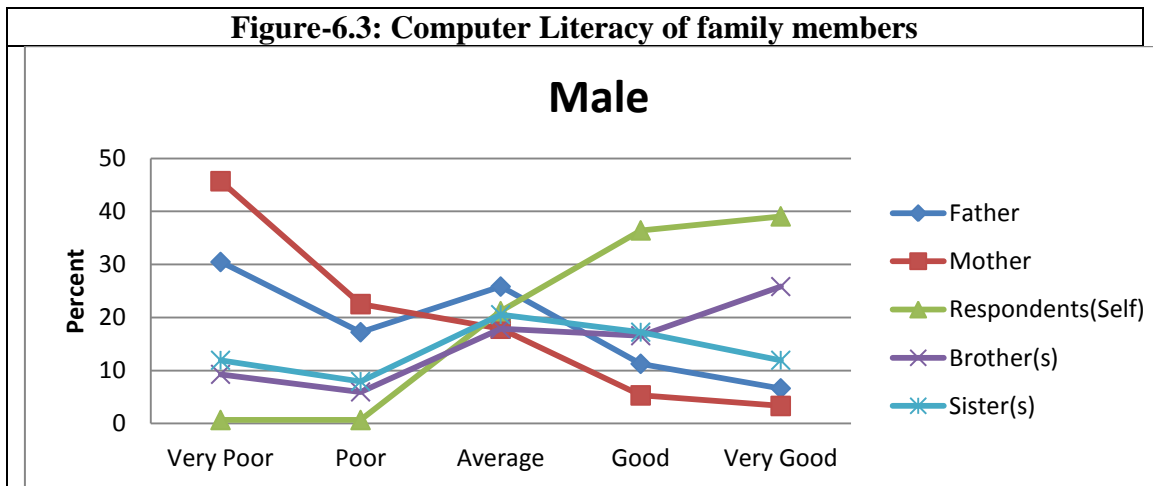
Source: Students' Survey

**Sources of managing expenses**

Despite differences in monthly family income, male and female students report same kind of sources with which they manage their expenses. Family support is the most reported source, followed by scholarships. This reiterates the point, made above, that comparatively better off families support their daughters for HE while male family support for male students is more prevalent among families with comparatively lower incomes. Thus, the reasons for family support for male and female students vary and are rooted in gender dimension. Very few students manage their expenses from part time jobs and giving tuitions or coaching. The responses might also be guided by the subjects and areas being studied by the students.

Figure-6.2: Sources of Managing Expenses (Multiple Responses)

Source: Students' Survey
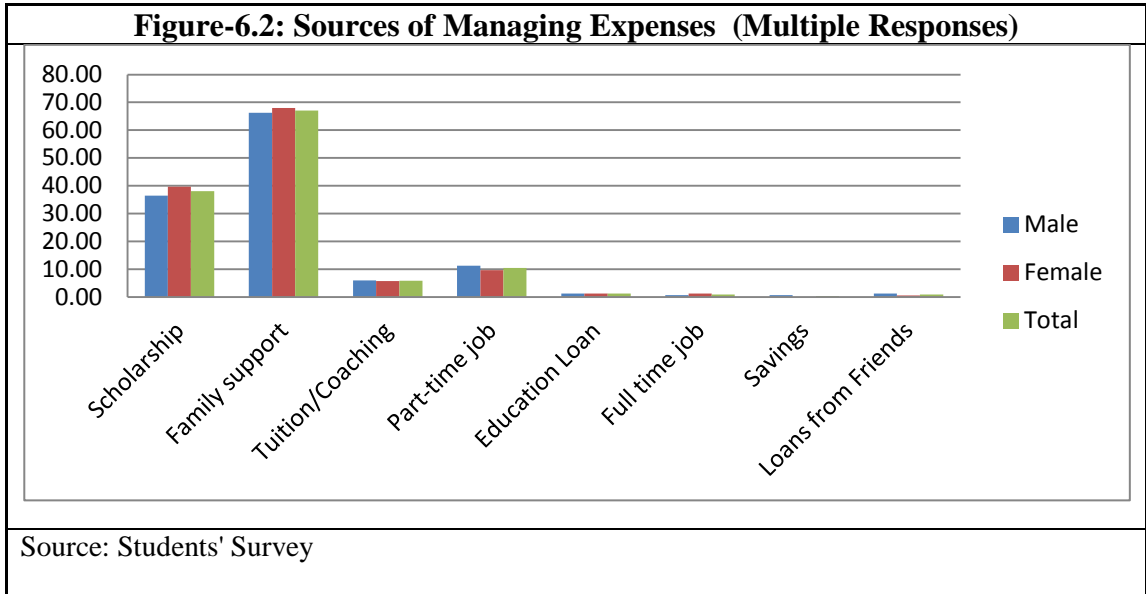
Computer Literacy

Family plays crucial role not only in supporting expenses related to education but also in influencing choices of students. So, education of family members and their capacity to process information adds to the background of students willing to pursue HE. In the Internet age, computer literacy can serve as an indicator for the information processing capacity. Figure-6.3 below presents the perception of respondents towards computer literacy of their family members and themselves.

Figure-6.3: Computer Literacy of family members
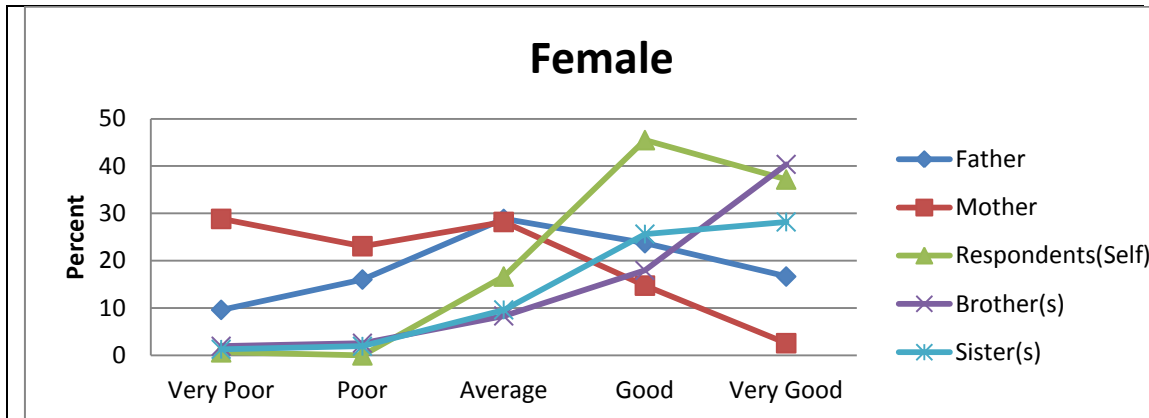
Female

Source: Students' Survey

The respondents rate themselves high on computer literacy as compared to their family members. Brother(s) and Sister(s) are rated as second and third respectively by male students while female respondents rate their Brother(s) higher than themselves on computer literacy. Parents, the older generation, are rated with comparatively lower computer literacy. With the difference of generation, gender difference also appears as among siblings. Brother(s) are rated better than Sister(s) and among parents Father is rated better than Mother. These differences in perceptions also vary according to gender and caste (social category) of the respondents. To ascertain the independence of the responses on computer literacy with gender and caste (general and non-general), chi-square tests are presented in Table-6.3 below-

Table-6.3 Chi-Sq test for Computer literacy of Family members (N=307)		
Family-Members	**Gender**	**Caste**
Father	31.84***	24.64***
Mother	17.81***	25.06***
Respondents(Self)	6.58	20.91***
Brother(s)	20.46***	32.80***
Sister(s)	37.93***	13.12***

Source: Students' Survey

The Table-6.3 shows that the ratings for computer literacy of family members is not independent of gender and caste of the respondents as the Chi-square values are significant but the rating for them is independent of their gender. These perceptions or ratings are significantly related to family income. The differences across three groups of family income- low (upto 30,000 per month), middle (30,000-50,000 per month) and high (more than 50,000 per month) are presented in Table-6.3.1 below. Bonferroni decomposition depicts the differences among the three income groups.

The rating for Computer literacy of mother significantly differs between families with employed mothers and house-wives, as the value of the F-statistic (30.82) is found to be significant.[90] Computer literacy indicates one of the indicators of information processing but requires to be complemented by many other affecting variables, to be discussed in this chapter gradually.

| Table-6.3.1: One way ANOVA for Computer literacy of Family members with Family Income (N=300)		
Family-Members	**F-statistic#**	**Bonferroni decomposition**
Father	25.18***	Between Low and Middle**, and Low and High**
Mother	12.25***	Between Low and Middle**, and Low and High**
Respondents(Self)	3.00*	
Brother(s)	2.28	
Sister(s)	3.49**	Between Low and High*, and Middle and High*

Source: Students' Survey
Degree(s) of Freedom: between groups-2, within groups-298

Marks obtained

Another indicator for information handling capability can be marks obtained by students. It also signifies their merit to qualify for admission as HE involves S-competition. Figure-6.4 below shows marks obtained by students enrolled at the three levels of degree programmes in their last public examinations. At each level of HE, the marks obtained by female students are higher than that of male students. Comparatively, higher marks of female students along with their comparatively richer family background indicate certain kind of barrier that they need to cross for entering into HE. The range of higher marks gradually decreases from 80-90 percent to 60-70 percent as one moves looking from UG to students pursuing research. Marks obtained by students represent their academic aptitude which is one of the important determinants of choice (Becker, 1964; Swell & Shah, 1978; Psacharopoulos & Soumelis, 1979; Jimmenze *et al, 2000).* It does not only work as a proxy for merit of students but also indicates their desire or willingness to study.

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[90] Degree(s) of Freedom: between groups-1, within groups-293

Figure-6.4: Marks scored by the Respondents in their last examinations
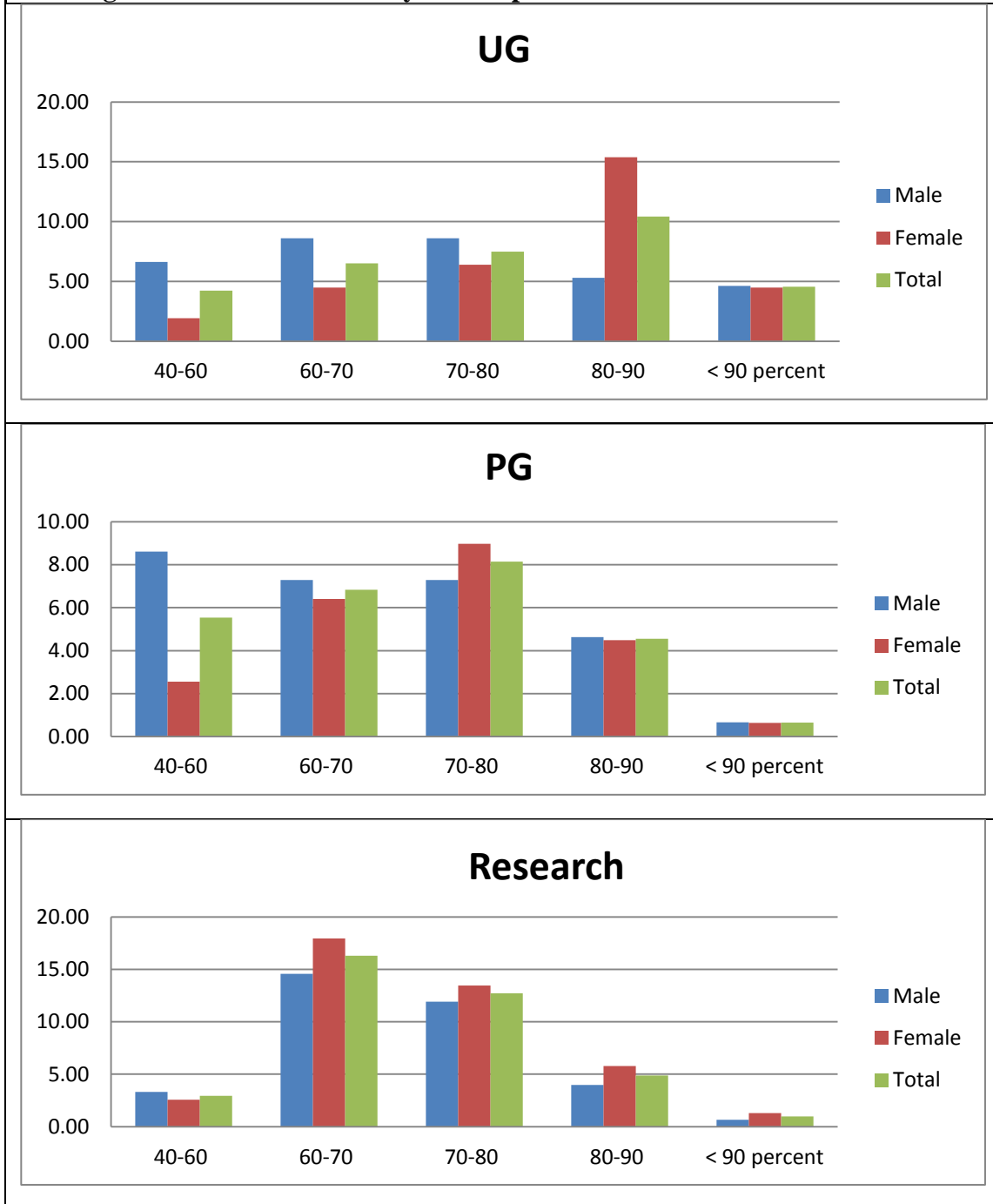
Source: Students' Survey

The observed dominance of female students in distribution of marks of the respondents' calls for chi-square test to ascertain independence of marks obtained with respect to gender. Significant chi-square coefficients for marks obtained in last and second last public examination establish that the marks are not independent of gender of the respondents (Table-6.4). This implies that female students with higher marks and with comparatively richer families are choosing HE, while for male students constraints are less as compared to female students.

| Table-6.4: Chi-Sq test for Marks obtained with Gender	
Marks obtained	**Chi-Sq**
Last public examination	11.09* (p- value=0.05)
Second last public examination	11.37**

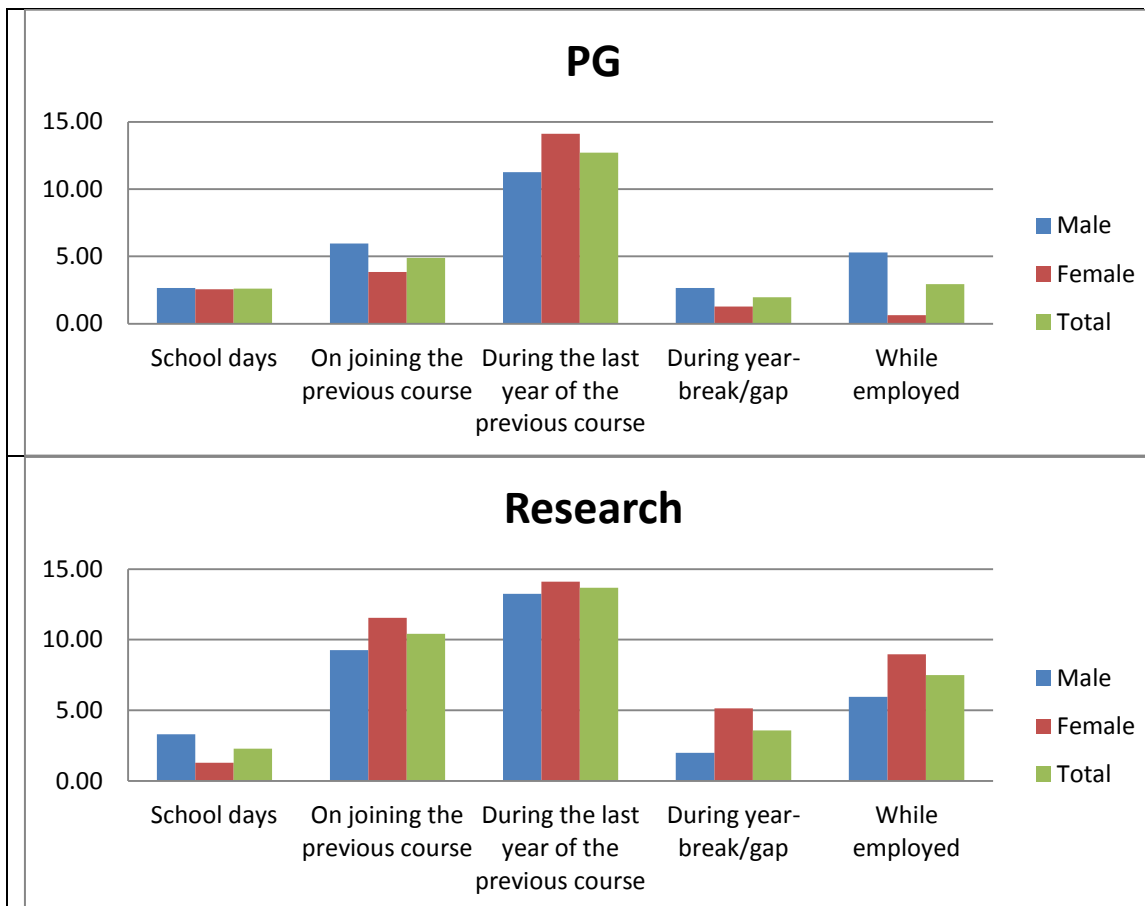Source: Students' Survey

6.3 Planning and Motivation for Higher Education

As discussed in chapters-2 and 3, evaluation of alternatives and choosing out from them is an important feature of choice. The evaluation of alternatives is preceded by motivating factors for choosing a certain good or service. Here, in the case of HE, planning for HE starts much early and is carefully carried out. The following sub-sections would present the planning for HE by students and their inspirations or motivations for HE.

6.3.1 Planning for HE:

As discussed in the second and third chapters, HE is so closely linked with professional life and livelihood that the decision for HE is one of the very important life-choices. Planning and preparation for HE in some way or another starts as early as school days. This is evident from the bar diagrams presented below. Respondents at each level of HE reveal that they started thinking for admission to their present course from their school days. However, the proportions of such respondents at the PG and Research levels are very small. The diagrams also show that such choices are of continuous nature but most of the respondents make decisions during last year of their preceding courses.

Figure-6.5 : Started Thinking Admission to Present Course

PG

Research
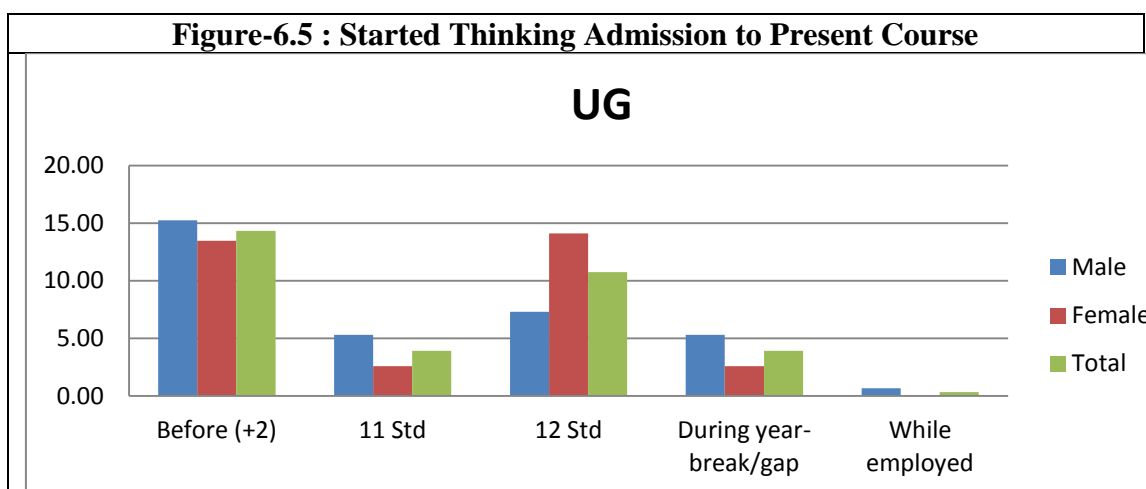
Source: Students' Survey

6.3.2 Motivation to Pursue HE

Even if efforts for admission to a particular course or a set of courses starts during the last year of the previous course or academic engagement, students draw inspirations or motivations for such choices from a variety of sources. The drawing of inspirations or motivations is a long process. Table-6.5 below presents such sources of inspirations. Career or job-prospects appears to be the most influencing motive to pursue HE. This source is independent of gender of the respondents as the corresponding chi-square coefficient is not significant. Feeling of self-achievement or esteem and enjoyment of subject are other two most reported sources of inspiration to pursue HE. These sources of inspirations along with other sources-financial security and influence of educated family members are not independent of gender of the respondents as the chi-square coefficient is significant.

Table-6.5 : Inspirations of Students to pursue HE					
Criterion	Use of Criterion	Male	Female	Total	Chi-Sq
Self-Esteem/Achievement	No	49.67	36.54	43.00	5.3974**
	Yes	50.33	63.46	57.00	
Social Status	No	82.12	82.69	82.41	0.0174
	Yes	17.88	17.31	17.59	
Social Networking	No	93.38	96.79	95.11	1.9282
	Yes	6.62	3.21	4.89	
Educated Family Members	No	76.16	60.26	68.08	8.9289***
	Yes	23.84	39.74	31.92	
Financial Security	No	72.85	59.62	66.12	5.9976**
	Yes	27.15	40.38	33.88	
Enjoyment of Subject	No	65.56	53.21	59.28	4.8544**
	Yes	34.44	46.79	40.72	
Career/Job-Prospects	No	43.05	36.54	39.74	1.357
	Yes	56.95	63.46	60.26	
Peer-Influence	No	87.42	95.51	91.53	6.4872**
	Yes	12.58	4.49	8.47	
Academic Profession	No	98.01	98.08	98.05	0.0016
	Yes	1.99	1.92	1.95	

Source: Students' Survey

Looking into the sources of inspirations between respondents belonging to General castes and those belonging to castes not included in General, that is, included in reserved categories; the influence of only two sources –educated family members and enjoyment of subject appear to be independent of caste of the respondents. Other sources are not independent of the castes of the respondents as depicted in Table-6.5.1 below.

Table-6.5.1: Caste-wise Inspirations of Students to pursue HE					
Criterion	Use of Criterion	General	Non-	Total	Chi-Sq
Self-Esteem/Achievement	No	44.55	42.23	43.00	0.149
	Yes	55.45	57.77	57.00	
Social Status	No	80.20	83.50	82.41	0.5083
	Yes	19.80	16.50	17.59	
Social Networking	No	95.05	95.15	95.11	0.0013
	Yes	4.95	4.85	4.89	
Educated Family Members	No	78.22	63.11	68.08	7.121***
	Yes	21.78	36.89	31.92	
Financial Security	No	73.27	62.62	66.12	3.429*
	Yes	26.73	37.38	33.88	
Enjoyment of Subject	No	72.28	52.91	59.28	10.5284***
	Yes	27.72	47.09	40.72	

|					
Career/Job-Prospects	No	42.57	38.35	39.74	0.5051
	Yes	57.43	61.65	60.26	
Peer-Influence	No	90.10	92.23	91.53	0.3981
	Yes	9.90	7.77	8.47	
Academic Profession	No	98.02	98.06	98.05	0.0005
	Yes	1.98	1.94	1.95	

Source: Students' Survey

6.4 Information: Search and Sources

In the second and third chapters, the role of search and factors influencing search have been discussed. These factors and processes depend on sources of information. These interrelationships will be presented in the following sub-sections utilising data from the students' survey.

6.4.1 Search

The following figure shows differences in timing of search for information by students at various levels. The students pursuing UG report maximum search carried out during their high-secondary studies, while those pursuing PG report last year of the previous course as the time they conducted most of the search. This implies that most searches happen at the last year of the previous course at all levels. This finding is supported by the responses of the research students as well. Thus, searching for information and thinking of admission (discussed above) happen simultaneously.

**Figure-6.6: Started searching for Information for present course**

PG
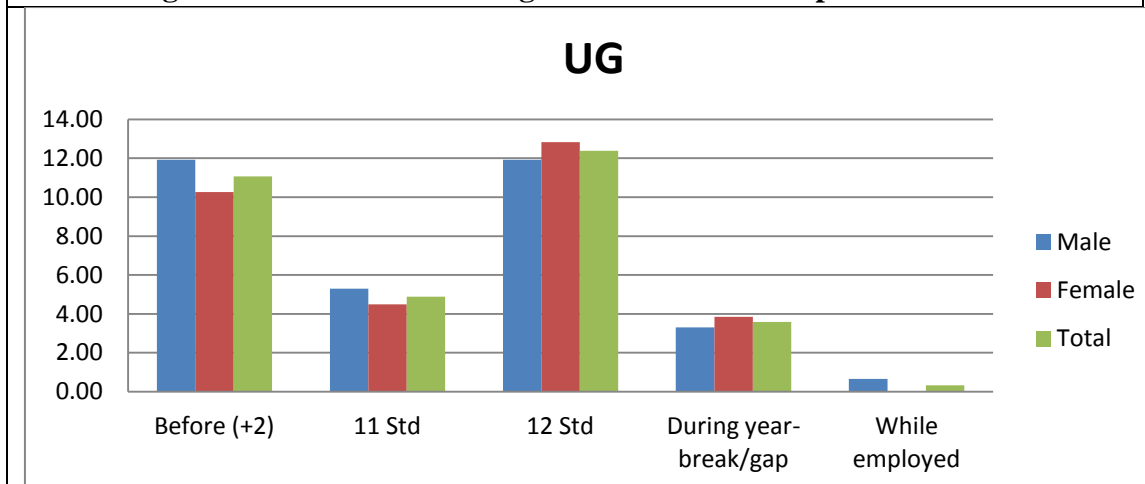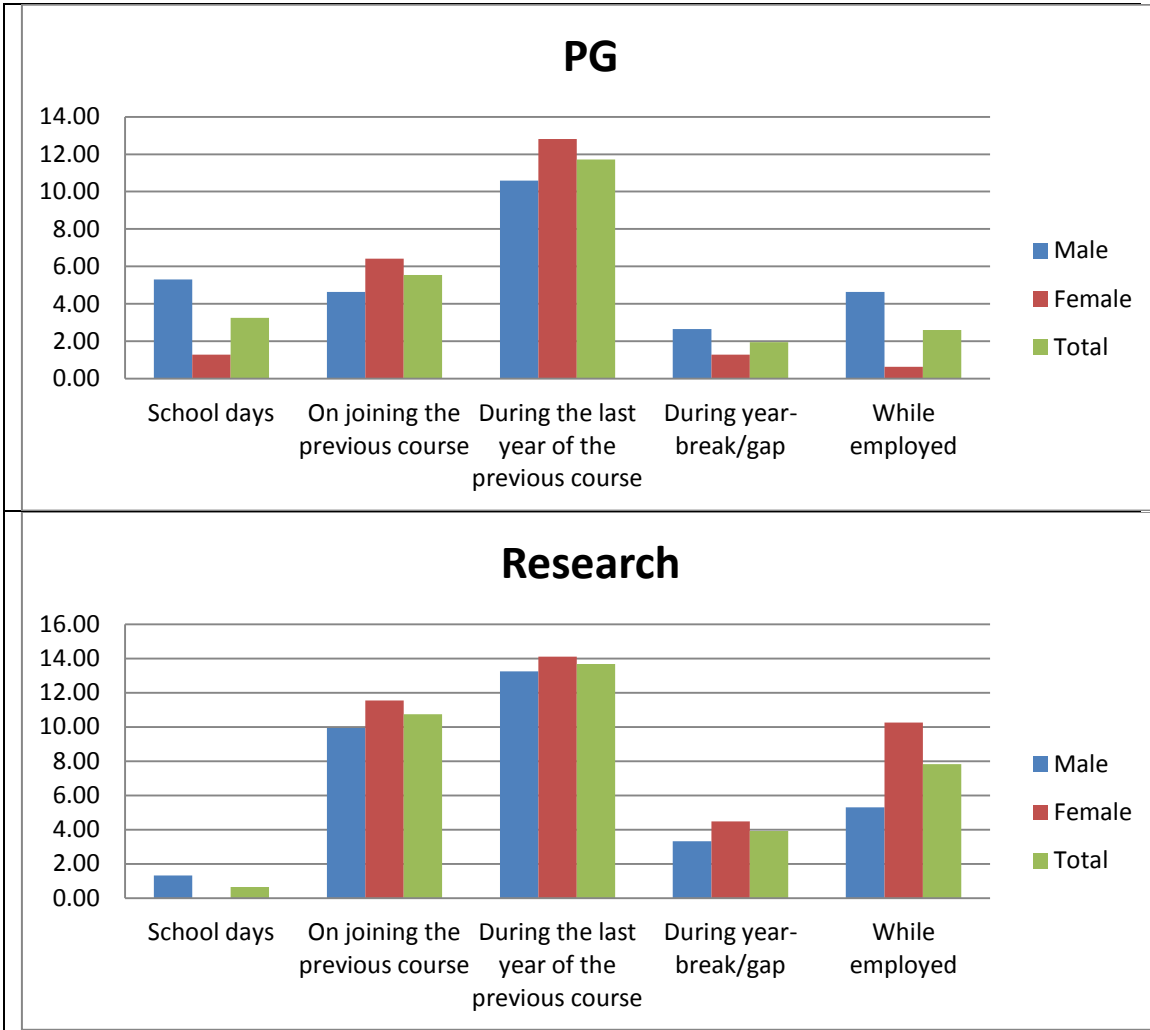
Research

Information seeking

As the process of search is supposed to be conducted mainly by students, the promptness of information seeking activity of students becomes very important. Students were asked to rate themselves on the basis of their information seeking activities and their perceptions are as follows-

Figure-6.7: Information seeking activity of students
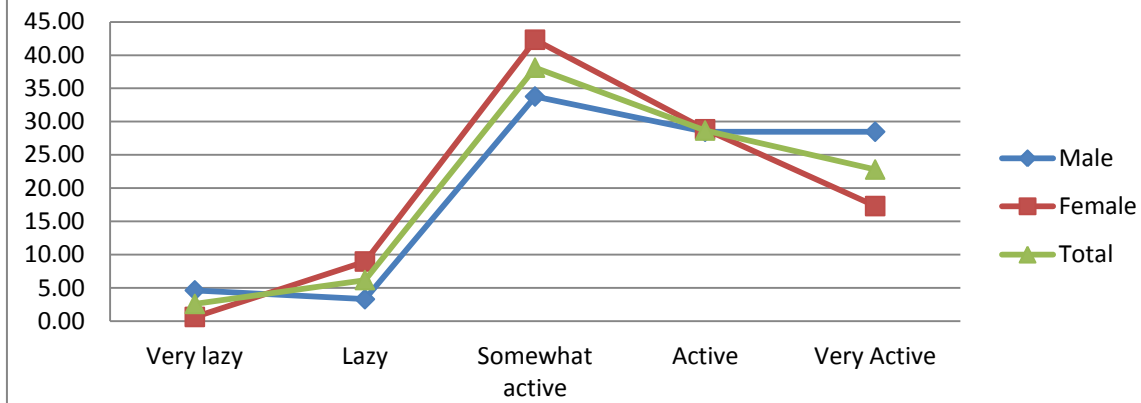
Source: Students' Survey

As depicted by Figure-6.7 above male students perceive themselves more active than their female peers and the difference between their own perceptions of information seeking is not independent of gender with the value of the Pearson's Chi-square (14.51**) found to be significant.[91]

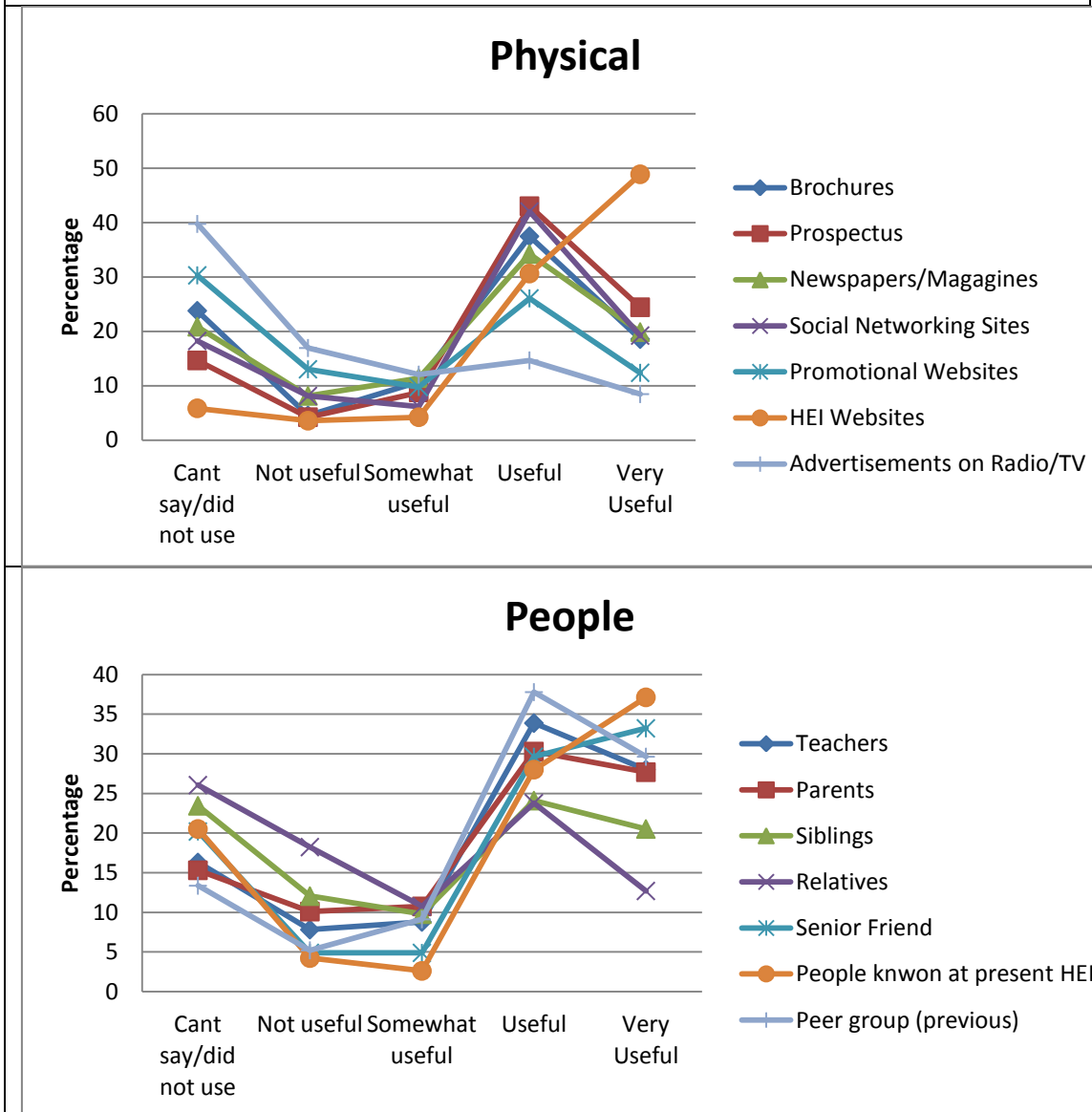## 6.4.2 Evaluation of Sources of Information

During the process of search, students use various sources and draw their experiences of using these sources. Their experiences might be based on usefulness of sources, ease of access, cost and their feeling of satisfaction or dissatisfaction arising out of these sources. Understanding these experiences would shed light on information processing in general.

Usefulness of Sources of Information

Figure-6.8 shows the perception towards usefulness of sources of information utilised before admission. Among the physical sources (non-living), websites of HEIs are perceived to be the most useful source of information. Prospectuses of HEIs are rated as the second most useful source of information. Among people, those known at present HEI are rated to be the most useful. Thus, information directly from HEIs, either from websites or people known at the HEIs, appears to be the most useful. This has implications for reliability and authenticity of information. Also, direct or primary sources might help in supplying more relevant and wholesome information.

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[91] Degree (s) of Freedom=5

174

**Figure-6.8: Perception towards usefulness of information sources utilised before admission**

Physical

Legend:
- Brochures
- Prospectus
- Newspapers/Magazines
- Social Networking Sites
- Promotional Websites
- HEI Websites
- Advertisements on Radio/TV

People

Legend:
- Teachers
- Parents
- Siblings
- Relatives
- Senior Friend
- People knwon at present HEI
- Peer group (previous)

Source: Students' Survey

6.4.3 Accessibility of information

While students prefer primary sources in terms of usefulness, such preference can be better explained by understanding the accessibility of information. The responses of students were sought on attributes related to accessibility-time, authenticity, readiness of information, comprehensiveness, distance and cost of access. The responses are presented in Figure-6.8 below in three panels representing gender, caste and level of present enrolment of students. As the Figure-6.8 shows, three most rated attributes of accessibility of information are-comprehensiveness (information being understandable), authenticity of information and information being readily available.

The responses do not vary much across gender and caste of the respondents but the level of enrolment of students shows significant differences for time and distance. With enrolment at higher levels, students find less time spent to collect information and information sources being less distant to be important attributes. The values of Pearson's chi-square for these two attributes across levels of enrolment are 10.44** and 6.49** respectively. Thus, time and distance become important as attributes of accessibility with increasing levels of enrolment. Authenticity might be one of the important attribute behind preference for primary sources; other attributes taken together explain the preference for websites as sources of information. To go deeper in our understanding, aspects related to cost of accessing information which includes time spent on information as well, distance of the sources of information, and websites as sources of information will be analysed with respect to backgrounds of students.

Figure-6.9: Information Accessibility by gender, caste and level of enrolment

176

Level of Enrolment

Source: Students' Survey
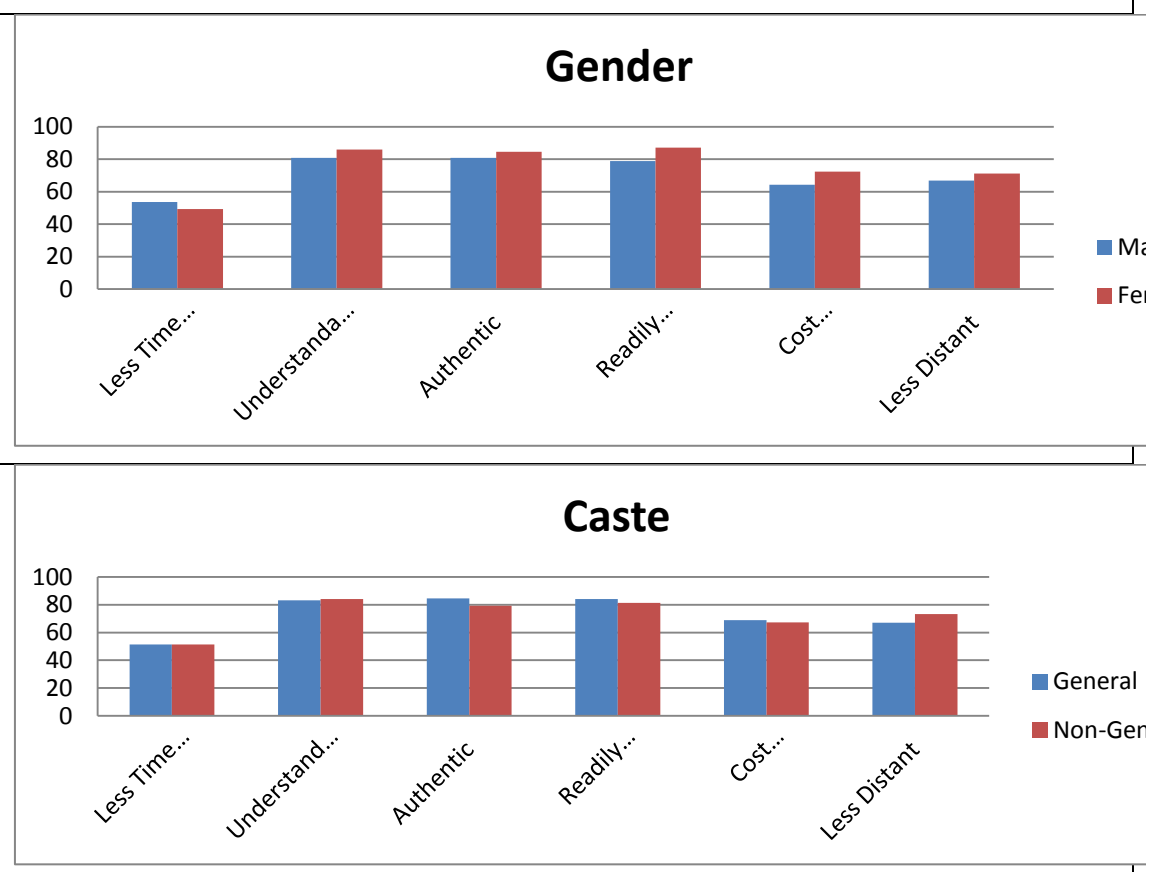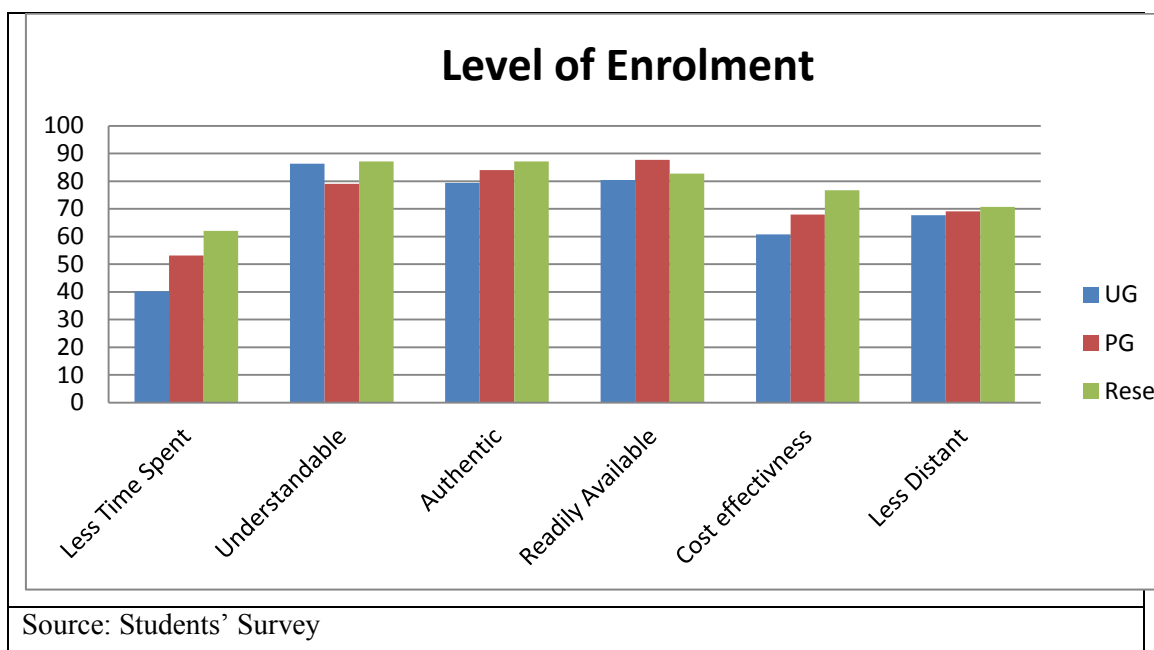
Cost of accessing Information

Experiences of students related to cost incurred for accessing information can be observed to be related to their family income while the results for levels of enrolment are significant. Thus, cost might not differ according to levels of enrolment, but according to family income of students, which guides their experiences and perceptions of cost. The Table-6.6 shows time (missing out on other things) and opportunity cost as elements of cost along with costs incurred on accessing sources.

Table-6.6: One way ANOVA for Cost of accessing Information		
Family Income (N=301)		
Cost related to	**F-statistic#**	**Bonferroni decomposition**
Missing on other activities	10.90***	Between Low and Middle**, and Low and High**
Opportunity Cost	07.14***	Between Low and High**
Brochures	14.21***	Between Low and Middle**, and Low and High**
Prospectus	08.54***	Between Low and Middle**, and Low and High**
Newspapers/Magazines	09.56***	Between Low and Middle**, and Low and High**
Knowing people	07.79***	Between Low and Middle**, and Low and High**
Internet	06.52***	Between Low and Middle**, and Low and High*
Visiting present HEI	02.07	
#Degree (s) of Freedom= between groups-2, within groups-298		
Level of Enrolment (N=299)		
Missing on other activities	0.37	
Opportunity Cost	0.47	

Brochures	0.04	
Prospectus	0.05	
Newspapers/Magazines	0.93	
Knowing people	0.49	
Internet	0.34	
Visiting present HEI	1.07	
#Degree (s) of Freedom= between groups-2, within groups-298		
Source: Students' Survey		

6.5 Reflections on Choice

Choice is a process of listing out of alternatives, evaluating them and choosing out of them. The discussion above helped us in understanding the process of listing out of alternatives. Now, we will discuss the evaluation of alternatives by the students and would try to understand their perceptions of change in reputation of their HEI. As reputation of HEIs plays important role in choice making, understanding changes in perceptions would reveal the evaluation of choice itself.

6.5.1 Evaluation of Alternatives

As choice goes through conceiving the idea, planning, influences, searching for information and evaluation of information on certain key parameters, these key parameters play important role in guiding the choices in general and information processing in particular. A description and analysis of such parameters to test alternatives or options are presented in this sub-section. Table-6.7 presented below shows reputation of HEIs to be the most important parameter utilised by the students to evaluate HEIs. Stigler (1961) mentioned reputation to be economising on information. In other words, reputation of HEIs appears to be signalling quality education and letting students economise on their efforts to search for information related to other attributes. The values of Pearson's Chi-Square measured for self-merit (students' perception of their academic aptitude) and parents-will (influence of parents) is significant across gender. This implies that girl students have to depend to higher merit as compared to their male counterparts in evaluating an alternative. They also have to abide by parents- will in choosing an HEI.

Table-6.7: Evaluation of Alternatives by Students					
Criterion	Use of Criterion	Male	Female	Total	Chi-Sq
EvlHEIs_Reputation	**No**	29.80	24.36	27.04	1.1521
	Yes	70.20	75.64	72.96	
EvlHEIs_Affordibility	**No**	51.66	51.28	51.47	0.0043

	Yes	48.34	48.72	48.53	
EvlHEIs_SelfMerit	No	43.05	27.56	35.18	8.0655***
	Yes	56.95	72.44	64.82	
EvlHEIs_Employabilit	No	58.94	60.90	59.93	0.1224
	Yes	41.06	39.10	40.07	
EvlHEIs_ParentsWill	No	79.47	67.31	73.29	5.7982**
	Yes	20.53	32.69	26.71	
EvlHEIs_DiscFrnds	No	65.56	73.08	69.38	2.0393
	Yes	34.44	26.92	30.62	
EvlHEIs_DiscTchrPrvI	No	61.59	64.10	62.87	0.2076
	Yes	38.41	35.90	37.13	
EvlHEIs_DiscRltvs	No	90.73	89.74	90.23	0.0844
	Yes	9.27	10.26	9.77	
EvlHEIs_DistParentalP	No	86.75	82.05	84.36	1.287
	Yes	13.25	17.95	15.64	
EvlHEIs_CampusEnv	No	74.83	80.77	77.85	1.5673
	Yes	25.17	19.23	22.15	

Source: Students' Survey

Table-6.7.1: Evaluation of Alternatives by Students at different levels of Enrolment					
Criterion	Use of	UG	PG	Research	Chi-Sq
EvlHEIs_Reputation	No	39.22	25.93	15.52	17.662***
	Yes	60.78	74.07	84.48	
EvlHEIs_Affordibility	No	55.88	39.51	53.45	9.7759**
	Yes	44.12	60.49	46.55	
EvlHEIs_SelfMerit	No	36.27	29.63	37.07	2.0999
	Yes	63.73	70.37	62.93	
EvlHEIs_Employability	No	60.78	53.09	62.93	2.8025
	Yes	39.22	46.91	37.07	
EvlHEIs_ParentsWill	No	63.73	70.37	82.76	11.257***
	Yes	36.27	29.63	17.24	
EvlHEIs_DiscFrnds	No	74.51	64.20	68.10	2.4955
	Yes	25.49	35.80	31.90	
EvlHEIs_DiscTchrPrvInst	No	73.53	58.02	56.03	8.6051**
	Yes	26.47	41.98	43.97	
EvlHEIs_DiscRltvs	No	81.37	92.59	96.55	14.9142***
	Yes	18.63	7.41	3.45	
EvlHEIs_DistParentalPlc	No	83.33	83.95	86.21	0.9231
	Yes	16.67	16.05	13.79	
EvlHEIs_CampusEnv	No	80.39	67.90	81.90	6.5652*
	Yes	19.61	32.10	18.10	

Source: Students' Survey

Analysing the evaluation of alternatives by students enrolled at UG and PG levels, it is found that significant chi-square differences are observed for reputation of HEIs, affordability, parents-will, discussion with teachers at previous institution, and discussion with relatives. Students pursuing UG courses discussed with their relatives in evaluating alternatives available to them while those at the PG level discussed mostly with teachers at their previous institutions. Parents-will also influenced students at the UG level more as compared to those at the PG level. Thus, it appears family and relatives do not only influence but are also sources of information but their influence and usefulness diminishes after UG level. This might be due to the fact that the subject and course choices mostly take place till the UG level. Thereafter, students also become more informed. Students at the PG level are also more concerned with affordability and employability than those at the UG level. This might also due the fact that along with influence, family support also decreases after the UG level. Among these attributes, discussion with relatives is found to be significantly different across caste-groups (Table-6.7.2 below). This indicates difference in dependence on relatives.

Table-6.7.2: Caste-wise Evaluation of Alternatives by Students						
Criterion	Use of	Gen	Other Backward	Schedule	Schedule	Chi-
EvlHEIs_Rep	No	23.7	37.93	26.32	30.43	5.103
	Yes	76.2	62.07	73.68	69.57	
EvlHEIs_Affo	No	53.4	51.72	63.16	26.09	8.340
	Yes	46.6	48.28	36.84	73.91	
EvlHEIs_Self	No	33.0	41.38	42.11	34.78	2.346
	Yes	66.9	58.62	57.89	65.22	
EvlHEIs_Emp	No	55.8	67.24	78.95	60.87	6.275
	Yes	44.1	32.76	21.05	39.13	
EvlHEIs_Pare	No	73.7	74.14	78.95	60.87	2.534
	Yes	26.2	25.86	21.05	39.13	
EvlHEIs_Disc	No	70.3	70.69	52.63	69.57	3.096
	Yes	29.6	29.31	47.37	30.43	
EvlHEIs_Disc	No	61.1	72.41	42.11	73.91	8.923
	Yes	38.8	27.59	57.89	26.09	
EvlHEIs_Disc	No	93.2	89.66	89.47	65.22	18.52
	Yes	6.80	10.34	10.53	34.78	
EvlHEIs_Dist	No	84.4	82.76	89.47	82.61	0.730
	Yes	15.5	17.24	10.53	17.39	
EvlHEIs_Cam	No	74.2	86.21	89.47	78.26	5.654
	Yes	25.7	13.79	10.53	21.74	

Source: Students' Survey

6.5.2 Reputation of HEI

As mentioned above, reputation economizes on search and is important for both the HEIs and students. In chapter-5, it has been observed that there are efforts by the HEIs to showcase their reputation through various contents on their websites. The logit model for rank/quality demonstrated causal relationships among such contents . In this sub-section, we seek to understand the demand for such contents by the students. We attempt to understand the perceptions of the respondents regarding the reputation of HEIs they are enrolled in. The perceptions undergo change as students get acquainted with their HEI through their day to day experiences. These changes reflect existence of information asymmetry on one hand and interrelationship of perceptions and experiences related to other variables. We try to develop a logit model to fit such changes.

Specification of the Model:

Reputation is built over the years and is gauged by many variables. It is perception of the society in general and the academic community in particular regarding the performance of an HEI over the years. Here, the dependent variable is the change in perception related to reputation of the HEI. The following Table-6.8 presents a list of variables which can lead to such changes in perception.

Table-6.8: List of variables for logit model for Reputation of HEIs				
Serial No	Name/Code	Label	Nature	Type
1	Lreput	Change in perception related to reputation of HEI	Dependent	Binary (No=0 and Yes=1)
2	DeemedUni	whether the HEI is a deemed university	Independent	Binary (No=0 and Yes=1)
3	PrsntHEI_top3chc	Whether the present HEI is among top three choices for admission	independent	Binary (No=0 and Yes=1)
4	PvtIns	whether the HEI is a private institution	independent	Binary (No=0 and Yes=1)
5	Gender	Gender of the respondent	independent	Binary (Male=0 and Female=1)
6	InTClb_Expctd	Change in perception related to International Collaborations of HEI	independent	Binary (No=0 and Yes=1)
7	CmpsEnvs_Expctd	Change in perception related to Campus Environment of HEI	independent	Binary (No=0 and Yes=1)
8	Alumni_NoOrVLit	Change in perception related to information on Alumni of HEI	independent	Binary (No=0 and Yes=1)

9	HSFrn_PrsntHEI	High Scoring friends at present HEI	independent	Binary (No=0 and Yes=1)
10	Fac_NoOrLit	Change in perception related to information on faculty of HEI	independent	Binary (No=0 and Yes=1)
11	PrGr_NoOrVLit	Change in perception related to peer group at HEI	Ind ependent	Binary (No=0 and Yes=1)

Some of the iterations of the regression exercises are given below-

R-H-1: logit lreput=f{i.PrsntHEI_top3chc i.Gender i.InfoSrch_ClassMates i.InTClb_Expctd i.CmpsEnvs_Expctd i.Alumni_NoOrVLit i.PvtIns i.HSFrn_PrsntHEI i.Fac_NoOrLit i.PrGr_NoOrVLit i.DeemedUni }, vce(robust)

R-H-2: logit lreput =f{i.PrsntHEI_top3chc i.Gender i.InfoSrch_ClassMates i.InTClb_Expctd i.CmpsEnvs_Expctd i.Alumni_NoOrVLit i.PvtIns i.HSFrn_PrsntHEI i.Fac_NoOrLit i.DeemedUni} , vce(robust)

R-H-3: logit lreput =f{ i.PrsntHEI_top3chc i.Gender i.InTClb_Expctd i.CmpsEnvs_Expctd i.Alumni_NoOrVLit i.PvtIns i.HSFrn_PrsntHEI i.DeemedUni} , vce(robust)

R-H-4: logit lreput=f{ i.PrsntHEI_top3chc i.Gender i.InTClb_Expctd i.CmpsEnvs_Expctd i.Alumni_NoOrVLit i.PvtIns i.HSFrn_PrsntHEI} , vce(robust)

The results of these iterations are presented below-

Table-6.8.1: Results of logit regressions for change in perception towards reputation of HEIs

VARIABLES	(1) Lreput	(2) Lreput	(3) Lreput	(4) Lreput
1.PrsntHEI_top3chc	-0.927**	-0.791**	-0.811**	-0.936**
	(0.402)	(0.388)	(0.375)	(0.366)
1.Gender	-0.756**	-0.768**	-0.845***	-0.809***
	(0.329)	(0.318)	(0.312)	(0.310)
1.InTClb_Expctd	-1.906***	-1.853***	-1.928***	-1.932***
	(0.447)	(0.426)	(0.415)	(0.415)
1.CmpsEnvs_Expctd	-1.174***	-1.270***	-1.339***	-1.265***
	(0.433)	(0.421)	(0.412)	(0.391)
1.Alumni_NoOrVLit	-0.764**	-0.813**	-0.859***	-0.834**
	(0.369)	(0.338)	(0.328)	(0.328)
1.PvtIns	1.489**	1.385**	1.335**	1.353**
	(0.641)	(0.612)	(0.611)	(0.612)
1.HSFrn_PrsntHEI	-0.959***	-0.958***	-0.868***	-0.849***
	(0.326)	(0.319)	(0.314)	(0.310)
1.Fac_NoOrLit	-0.778*	-0.763*		
	(0.406)	(0.395)		
1.PrGr_NoOrVLit	-0.505			
	(0.367)			
1.DeemedUni	-0.411	-0.476	-0.662*	
	(0.387)	(0.386)	(0.383)	
Constant	3.807***	3.480***	2.981***	2.844***
	(0.585)	(0.547)	(0.470)	(0.453)
Observations	256	259	262	262

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Researchers' estimation.

The results are hetero-robust. R.H-4 is the model with McFadden pseudo R2 more than 0.2 and confirming to linktest. The results of the linktest which are used for existence of specification error, if any, are presented in Table-6H.3 in the appendix. The results of the R.H-4 can be interpreted as follows-

The logit model takes the form:

Logit(p/1-p)=2.844 -0.936 PrsntHEI_top3chc -0.809Gender -1.932 InTClb_Expctd -1.265 CmpsEnvs_Expctd -0.834 Alumni_NoOrVLit +1.1353 PvtIns -0.849 HSFrn_PrsntHEI

Where p is the probability of change in perception related to reputation of HEI

(i)   PrsntHEI_top3chc: The coefficient of the parameter is -0.936. So, we expect a decrease in log-odds by 0.936 of the dependent variable if the present HEI of the respondents happens to be among his/her top three choices, keeping other independent variables unchanged.

(ii)   Gender: The coefficient of this binary variable is -0.809. So, we expect a 0.809 decrease in log-odds of the dependent variable if the respondent is a female as compared to a male respondent, keeping other independent variables constant.

(iii)   InTClb_Expctd: As the coefficient is negative for this parameter also, a decrease in log-odds of the dependent variable is expected by 1.932 if there is a change in perception related to international collaboration of HEI with all other independent variables being constant.

(iv)   CmpsEnvs_Expctd: Like the change in perception related to international collaboration, the change in perception related to campus environment of the HEI also has negative coefficient. So, keeping other independent variables constant, we expect a 1.265 decrease in the log-odds of the dependent variable if there is a change in perception related to campus environment.

(v)   Alumni_NoOrVLit: The coefficient of this parameter is also negative, so it can also be interpreted in the same way as the above one. It would lead to a 0.834 decrease in the log-odds of the dependent variable if there is change in perception related to alumni of HEI, keeping other independent variable constant.

(vi)   PvtIns: This parameter has positive coefficient. So, we expect a 1.1353 increase in the log-odds of the dependent variable if the respondent is enrolled in a private HEI, all other independent variables being constant.

(vii)   HSFrn_PrsntHEI: This parameter has negative coefficient denoting a 0.849 decrease in the log-odds of the dependent variable if the respondent has a friend circle of high scoring friends, keeping other variables constant.

Summary of the Results:

The variables leading to decrease in the log-odds of the dependent variable are institutional-starting from present HEI being among the top three choices, to being in a friend circle of high scoring friends at the present HEI. Students being able to get admission in their top three choices of HEIs , are less likely to feel change in perception towards the reputation of the HEI. Other institutional variables-international collaboration, campus environment, alumni and high scoring students make the change in perception towards reputation less likely. Only one institutional variable-HEI being a private one, can lead to changes in perception towards reputation of HEI. Only one student related variable-gender appears to play role in inducing changes in perceptions related to reputation. Male students are more likely to change their perceptions as compared to female students. This can also be understood in the light of discussion above that readiness to process information is more amongst male students than amongst female students.

6.6 Experiences and Perceptions of Information Processing

Evaluation of choices is the ultimate and one of the important stages of consumer search process (Reih & Holligos,). Jackson (1982) also considered the evaluation of educational choices as an important stage. This section would present an evaluation of choices made by students in terms of their experiences and perceptions and changes in them. One of such perceptions can be awareness of students related to institutional characteristics of their HEIs- location of HEIs and categories of HEIs. While location can be an indicator for readiness indicating general information seeking ability of the students, awareness of the categories of HEIs have implications for existence of information asymmetry in HE market and might be the product of information overload.

6.6.1 Information processing: Readiness and Asymmetry

This sub-section intends to explore the readiness of the respondents for information processing. Here, readiness refers to totality of willingness, capability and efforts to be informed. However, any sort of decomposition of readiness is beyond the scope of this research. The objective behind exploring the readiness of the respondents is to understand their experiences and perceptions in a better way. To explore the readiness of the respondents, their awareness regarding the location of their HEI and the kind of

the HEI is utilised. The awareness of location was not asked directly rather the respondents were asked to furnish their address and name of their present institution. The location of HEIs where the students are enrolled is derived from this information. The online questionnaire asks students to mention the location of their present and last/previous institution in terms of categories such as village, city, and metro etcetera[92]. The responses with respect to present institution are matched with that obtained from address and name of the present institution. This matching of location not only helps in verifying the responses but also to understand the awareness of the students regarding geographical or administrative locations. The indirect way to derive the awareness of location does not let the respondents even know that their awareness is being tested. Geographical or administrative locations are generally part of common or general understanding. When students get enrolled in an HEI, their awareness of its location might indicate their readiness of information processing as mentioned above.

Table-6.9: Respondents' awareness of Location of HEIs			
Matching status	Male	Female	Total
Cannot be matched	5.3	1.9	3.6
Match	58.9	53.2	56.0
Mismatch	35.8	44.9	40.4
Total	100	100	100

Source: Students' Survey

In the Table-6.9, locations of respondents who have not mentioned their address (either incomplete or not mentioned at all) cannot be matched. However, the proportion of such respondents is very low. While the details of location match for most of the respondents (56 per cent), it does not match for a considerable proportion (40.4 per cent). A gender difference is observed in the matching of awareness of locations. Independent t-test by gender shows significant difference of means (Table-6.9.1). The results indicate that male students are comparatively more ready for information processing than female students.

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[92] Please refer to the Question No-15 of the questionnaire available in the Annexure-....

Table-6.9.1: Independent t-test of Location of HEIs by Gender	
Null-hypothesis (Ho)	Difference of mean of male and female=0
T	-1.9890
Degrees of freedom	305
Pr(|T| > |t|)	0.0476

Source: calculations based on Students' survey

This mismatch indicates the readiness of respondents to process information. As discussed in Chapter-3, bounded rationality might emerge from various constraints ranging from capability of individual to process information, to external factors such as socio-economic background, time, and distance etcetera. One of the ways to peep into the handling of information by the respondents is their awareness of location and categories of the HEIs they are enrolled in. Respondents' idea of location of their HEI and the category of the HEI (kind of degree awarding HEI they are enrolled in) can be considered as indicators to understand the importance of such information to students, their awareness and their behaviour as rational consumers. The respondents were asked the category of institutions they have studied and are studying[93]. While the options for previous institution were broad, the categories for present institution were standardised according to the mode of funding and degree awarding capacity of the HEIs. The status of responses and their matching with actual categories, carried out with the help of the name of the HEI revealed by the respondents, is given in Table-6.10 below-

Table-6.10 : Respondents' awareness of Categories of HEIs			
Responded		Actual	
Category	Percentage	Category	Percentage
INI	9.77	INI	3.91
CU	42.35	CU	42.02
SU	21.17	SU	24.10
GDU	19.87	CDU	20.20

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[93] Question Nos-13 and 14 of the Online Questionnaire

		SDU	0.98
PU	4.89	PU	3.58
PDU	1.63	PDU	1.30
No response	0.33	Name not revealed	3.91
Total	**307**	**Total**	**307**

Source: Students' Survey

246 responses match with actual categories of HEIs. Gender-wise and caste-wise matching of responses are presented in the Tables-6C.2 and 6C.3 (Please see Appendix). The differences across caste and gender categories are very small. Independent t-tests and chi-square tests for the two categories of groups are not significant. When the mismatch across background variables (gender and caste) is found not to be significant, the mismatch indicates the role of procedural factors such as information search, access to sources etcetera. A logistic regression is attempted with the awareness of categories as dependent variable and match and mismatch as binary outcomes.

Specification of the Model

Since there are no studies to provide background for specification, an effort is made to estimate an econometric model with various iterations of combination of independent variables chosen non-randomly. The exploratory model specification is proposed as follows-

Cat_HEI_Match $(A_i) = f(SE_i , SP_i, CatHEI_i, S_i)$

Where A_i is awareness regarding category of HEI (matching status of category of HEI)

SE_i is vector of variables related to search efforts by the students

SP_i, is vector of variables related to search plan/thinking admission by the students

$CatHEI_i$ is vector of variables related to category or kind of HEI

S_i refers to the characteristics related to students such as their socio-economic background, location etcetera.

A list of variables for the above mentioned vectors is given below-

Table-6.10.1: List of variables for logit model for Awareness of HEI category				
Serial No	Name/Code	Label	Nature	Type
1	Cat_HEIMatch	matching of category of HEI	dependent	Binary (match=0 and mismatch=1)
2	DeemedUni	whether the HEI is a deemed university	independent	Binary (No=0 and Yes=1)
3	StrtThkngAdmn_PrsntCrs_Res	the time since the student started thinking of admission to present course	independent	Categorical (school days=0, other values enter as 1in regression equation as separate variables. The values are-On joining the previous course, During the last year of the previous course, During year break/gap, While employed (temporary/permanent)
4	PvtIns	whether the HEI is a private institution	independent	Binary (No=0 and Yes=1)
5	Capital	Whether the HEI is in a capital City	independent	Binary (No=0 and Yes=1)
6	UG	Present enrolment of students in UG	independent	Binary (No=0 and Yes=1)
7	PG	Present enrolment of students in PG	independent	Binary (No=0 and Yes=1)
8	Research	Present enrolment of students in Research courses (M.Phil/PhD)	independent	Binary (No=0 and Yes=1)
9	East	Whether the HEI is located in the Eastern part of India	Independent	Binary (No=0 and Yes=1)
10	Intrntmor1mnth	Students use Internet more than once a month at present	Independent	Binary (No=0 and Yes=1)

Some of the iterations of regression exercises are as follows-

R.D-1: logit Cat_HEIMatch= f{i.DeemedUni   i.StrtThkngAdmn_PrsntCrs_Res   i.PvtIns i.Capital i.UG i.PG i.Research i.East i.Intrntmor1mnth} , vce(robust)

R.D-2: logit Cat_HEIMatch= f{i.DeemedUni   i.StrtThkngAdmn_PrsntCrs_Res   i.PvtIns i.Capital i.UG i.PG i.East i.Intrntmor1mnth} , vce(robust)

R.D-3: logit Cat_HEIMatch= f{i.DeemedUni   i.StrtThkngAdmn_PrsntCrs_Res   i.PvtIns i.Capital i.UG i.East i.Intrntmor1mnth} , vce(robust)

R.D-4: logit Cat_HEIMatch= f{ i.DeemedUni   i.StrtThkngAdmn_PrsntCrs_Res   i.PvtIns i.East i.Intrntmor1mnth} , vce(robust)

The results of these exercises are presented in the following Table-6.10.2

Table-6.10.2: Results of Logit regression (R.D1 to R.D4)				
	(1)	(2)	(3)	(4)
VARIABLES				
1.DeemedUni	1.667***	1.667***	1.683***	1.404***
	(0.508)	(0.508)	(0.484)	(0.454)
2.StrtThkngAdmn_PrsntCrs_Res	-2.869***	-2.869***	-2.925***	-2.580***
	(0.797)	(0.797)	(0.780)	(0.650)
3.StrtThkngAdmn_PrsntCrs_Res	-1.874***	-1.874***	-1.919***	-1.865***
	(0.446)	(0.446)	(0.467)	(0.432)
4.StrtThkngAdmn_PrsntCrs_Res	-3.446***	-3.446***	-3.467***	-3.353***
	(0.908)	(0.908)	(0.974)	(1.023)
5.StrtThkngAdmn_PrsntCrs_Res	-1.881***	-1.881***	-2.052***	-1.870***
	(0.694)	(0.694)	(0.720)	(0.646)
1.PvtIns	1.296**	1.296**	1.509***	1.590***
	(0.520)	(0.520)	(0.495)	(0.474)
1.Capital	0.591	0.591	0.513	
	(0.477)	(0.477)	(0.450)	
1.UG	0.219	0.219	-0.329	
	(0.558)	(0.558)	(0.448)	
1.PG	0.888	0.888		
	(0.578)	(0.578)		
1o.Research	-			
1.East	-1.033**	-1.033**	-0.819*	-0.874*
	(0.490)	(0.490)	(0.466)	(0.452)
1.Intrntmor1mnth	2.461***	2.461***	2.457***	2.114**
	(0.951)	(0.951)	(0.937)	(0.889)
Constant	-1.002	-1.002	-0.546	-0.336
	(0.684)	(0.684)	(0.595)	(0.355)
Observations	287	287	287	292

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results are hetero-robust. R.D-4 is the model with McFadden pseudo R2 more than 0.2 and confirming to linktest. The results of the linktest which are used for existence of specification error, if any, are presented in Table-6A.10.3 in the appendix. The results of the R.D-4, which are hetero-robust, can be interpreted as follows-

The logit model takes the form:

Logit(p/1-p)= -0.336+1.404DeemedUni -2.58StrtThkngAdmn_PrsntCrs_Res$_2$ -1.865 StrtThkngAdmn_PrsntCrs_Res$_3$ -3.353StrtThkngAdmn_PrsntCrs_Res$_4$ -1.87 StrtThkngAdmn_PrsntCrs_Res$_5$+1.59PvtIns-0.874East+2.114Intrntmor1mnth

Where p is the probability of mismatch of category of HEIs

(i)   DeemedUni: The coefficient of the parameter is 1.404. So, we expect a 1.404 increase in the log-odds of the dependent variable if the respondent is enrolled in a deemed to be university as compared to other respondents, holding all other independent variables constant.

(ii)   StrtThkngAdmn_PrsntCrs_Res: The different stages of starting thinking of admission to present course have negative coefficients. Thus, we expect a decrease by the amount of co-efficient in the log-odds of the dependent variable if the respondent started thinking of admission at a certain stage. The other independent variables are held constant including the other stages of started thinking of admission to present course.

(iii)   PvtIns: The coefficient of the parameter is 1.59. So, we expect a 1.59 increase in the log-odds of the dependent variable if the respondent is enrolled in a private HEI as compared to other respondents, holding all other independent variables constant.

(iv)   East: The coefficient of the parameter is -0.874. So, we expect a 0.874 decrease in the log-odds of the dependent variable if the respondent is enrolled in an HEI located in the eastern part of the country as compared to other respondents, holding all other independent variables constant.

(v)   Intrntmor1mnth: The coefficient of the parameter is 2.114. So, we expect a 2.114 increase in the log-odds of the dependent variable if the respondent uses the internet more than once a month as compared to other respondents, holding all other independent variables constant. Using the internet more than once a month is an indicator of frequency of use of the internet and indicates relatively less use.

Summary of Results: Students who use the internet less and are enrolled in deemed universities and private HEIs are more prone to be having comparatively lesser awareness of kind or category of their institution. Students in HEIs located in the eastern part of the country and those who start thinking of admission after school at various stages seem to be acquiring information related to kind or category of their present institutions better than others. Thus, there are two kinds of variables determining the awareness of students regarding the category of their HEI. The first

kind of variables can be called institutional such as HEI being deemed to be university or a private and located in the eastern part of the country. The second kind is students' search behavior- use of internet and timing of starting thinking for admission to the present course. The institutional variables indicate the information furnishing patterns of certain kinds of HEIs and the role of surroundings and community of a particular location.

6.7 Governance of HEIs: Students' perspectives

The discussion so far has been focussed on information needs of students of HE along with the way they search, evaluate and make choices. Their information processing is also characterised by their abilities and information availability. The last two chapters also discussed the existence of imperfection, asymmetry and overload of information in the HE sector. Despite the overwhelming presence of information around us as mentioned in the first two chapters, these situations of imperfection, asymmetry and overload of information call for regulation. The existing policy guidelines and regulatory framework for information dissemination by the HEIs are discussed in the first chapter. The awareness and perceptions towards these regulatory prescriptions need to be understood along with evaluation of compliance by the HEIs. This section seeks to serve this purpose.

As the main purpose of the online questionnaire was to seek responses from students related to their experiences of information search, perceptions and experiences at their present HEIs, they were also asked their awareness of regulations aimed at ensuring information flow from HEIs to students and select regulating bodies. These regulatory bodies are not only mandated to ensure standard and quality of HE but also act as third party sources of information for students. While third party sources of information are conceived as independent sources to bridge information asymmetry between the buyers and sellers, in HE market these regulating bodies are supposed to regulate the information flow from HEIs and compensate for imperfection and asymmetry in information by providing updates on key aspects of HE such as fake universities, statutory status of HEIs etcetera[94].

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[94] The market for goods and services in general is characterised with third party sources which are profit seeking enterprises and may act on the behest of the sellers. Some examples of third party sources are- Yellow pages, Policybazaar.com etcetera.

Regulations/Schemes

Awareness of students related to regulations or schemes implemented to ensure smooth flow of information from HEIs to students is presented in Figure-6.9 below. The regulations depicted are *the Prohibition of Unfair Practices Bill, 2010* (PUPB), *Mandatory Disclosures* (MD), the *Right to Information* (RTI) and the *National E-Governance Plan* (NEGP)-the predecessor of the present scheme *Digital India.* These regulations or schemes are discussed in detail in the first chapter. The Figure shows that the awareness of students related to the RTI is the most while that for the mandatory disclosures in the least. Male students are more aware of Mandatory Disclosures while female students are more aware of the RTI with a small percentage difference. It is to be noted here that mandatory disclosures are not only binding HEIs offering technical and professional courses rather they are also compulsory under the RTI Act. The scope of mandatory disclosures under the RTI is even wider. The popular notion of Mandatory Disclosures is the one meant for technical and professional courses and the questionnaire used the same notion. The differences in the awareness of the RTI and that of the Mandatory Disclosures indicate that the students are not fully aware of the scope of the two regulations.

Figure-6.10: Awareness of Students related to Regulations/Schemes ((N=307, in percentage)

Source: Students' Survey

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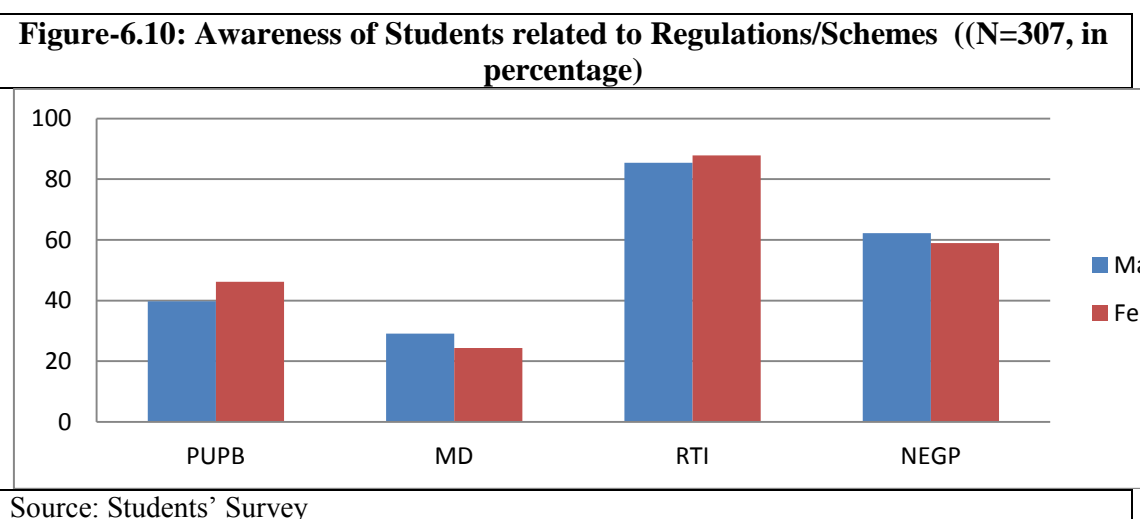
Figure-6.11: Change in perceptions related to Mandatory Disclosures((N=307, in percentage)
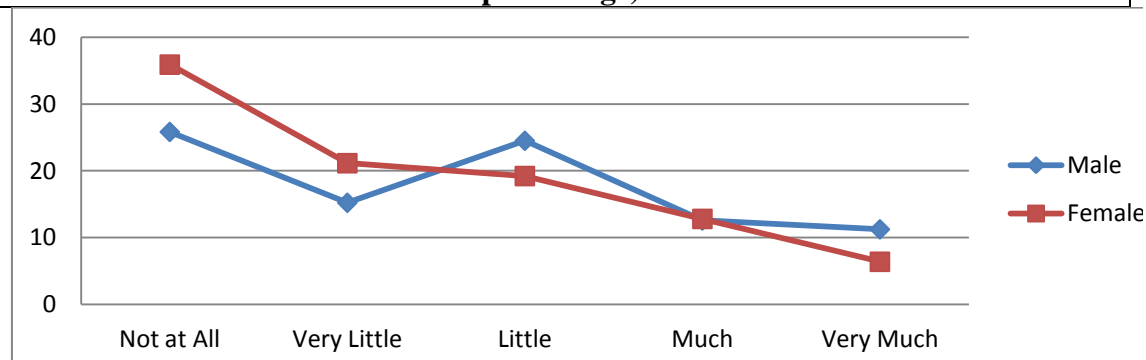
Source: Students' Survey

If the change in perceptions related to Mandatory Disclosures is analysed, as presented in Figure-6.10, it can be seen that male students feel more changes in their perceptions as compared to female students. The relative change in perceptions goes along their respective levels of awareness as shown above. Majority of students do not feel change in perceptions. This might be due to variation in understanding the scope of the Mandatory Disclosures as indicated by the differences in the levels of awareness of the RTI and Mandatory Disclosures. The variation in understanding, that is, lack of awareness of scope is also indicated by the reporting of the existence of information asymmetry by the students. One way ANOVA for caste groups (general and non-general), family income and marks obtained in last examination do not return significant results for awareness of students related to mandatory disclosures. The results of the analysis for the regulations and schemes mentioned above are presented in Table-6.11. There are no significant variations across gender but awareness related to the RTI and the NEGP show significant differences across caste. Non-General caste groups have lower mean and higher standard deviation as compared to General castes. Family income appears to be affecting awareness related to mandatory disclosures and the PUPB while marks obtained in last examination as an indicator of merit significantly affects awareness related to the PUPB which lapsed in the Parliament but had very important implications for the HE sector..

Table-6.11: One-way ANOVA for Awareness related to Regulations/Schemes				
Caste				
Regulations/ Schemes	Central Tendency	General (N=206)	Non-General (N=101)	F-Statistic
Mandatory Disclosures	Mean	0.28	0.24	0.67
	S.D	0.45	0.43	

				F-Statistic
PUPB	Mean	0.46	0.37	2.49
	S.D	0.50	0.48	
RTI	Mean	0.89	0.81	3.9**
	S.D	0.31	0.39	
NEGP	Mean	0.67	0.49	9.41**
	S.D	0.47	0.50	

Degree(s) of Freedom: Between Groups-1, Within Groups-306

Family Income				
		Low (N=129)	Middle (N=66)	High (N=106)	**F-Statistic**
Mandatory Disclosures	Mean	0.23	0.21	0.34	2.35*
	S.D	0.42	0.41	0.48	
PUPB	Mean	0.41	0.35	0.52	2.7*
	S.D	0.49	0.48	0.50	
RTI	Mean	0.87	0.83	0.90	0.71
	S.D	0.34	0.38	0.31	
NEGP	Mean	0.59	0.53	0.68	2.07
	S.D	0.49	0.50	0.47	

Degree(s) of Freedom: Between Groups-2, Within Groups-298

Marks obtained in the last examination				
		Low (N=132)	Middle (N=88)	High (N=82)	**F-Statistic**
Mandatory Disclosures	Mean	0.25758	0.34091	0.21951	1.7
	S.D	0.43800	0.47600	0.41600	
PUPB	Mean	0.33333	0.48864	0.53659	5.14**
	S.D	0.47300	0.50270	0.50170	
RTI	Mean	0.86364	0.88636	0.89024	0.21
	S.D	0.34440	0.31900	0.31400	
NEGP	Mean	0.59091	0.70455	0.54878	2.42*
	S.D	0.49350	0.45880	0.50000	

Degree(s) of Freedom: Between Groups-2, Within Groups-299

Source: Students' Survey

Caste and merit of students seem to be affecting their awareness related to regulations more than other variables. Let us now examine the awareness of students related to regulating bodies

Regulating Bodies

As mentioned above, regulating bodies in HE do not only act as third party sources but also intervene to maintain standards and quality. So, awareness of regulating bodies indicates one's general awareness of HE on one hand and awareness of third party sources of information on the other. Figure-6.11 below depicts awareness of students related to select regulating bodies. There are three regulating bodies and two

accreditation agencies presented in the Figure-6.11. The regulating bodies are- the University Grants Commission (UGC), the All India Council for Technical Education (AICTE) and the Medical Council of India (MCI)[95]. There are two accreditation agencies- one public and the other private. The public agency with a statutory mandate is National Accreditation and Assessment Council (NAAC). The other private agency is Indian Council of Accreditation and Assessment (ICAA).

Figure-6.12: Awareness of Students related to Regulating Bodies ((N=307, in percentage)
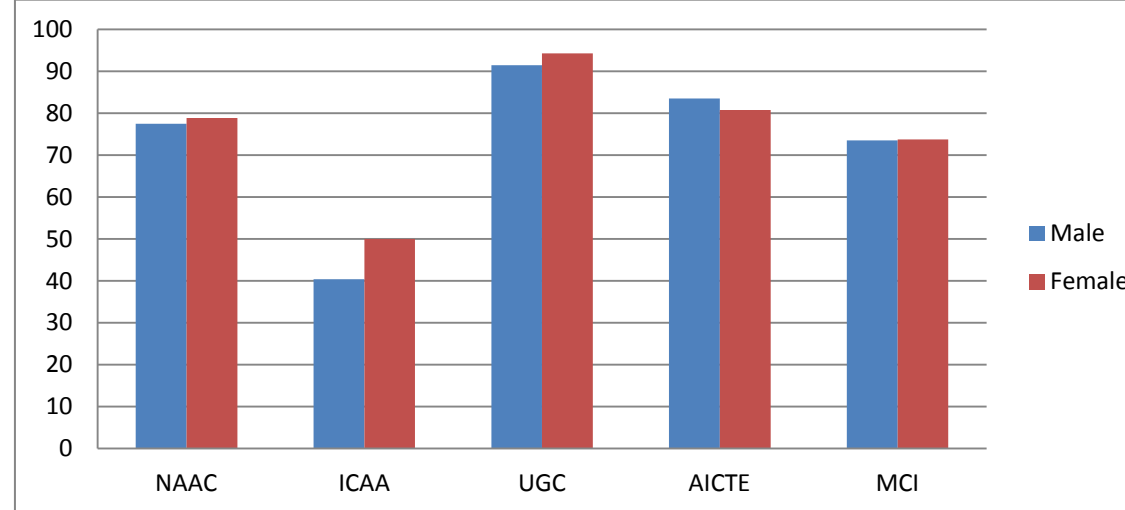
Source: Students' Survey

The Figure above shows that the awareness of students related to regulating bodies is more than that of regulations mandated by these bodies. Students are least aware of the private agencies, while the UGC is widely known among students. This indicates that even if students are not much aware of regulations, they are aware of the regulating bodies set up by the government. Let us now examine the whether the awareness related to regulating bodies is affected by the background of students. One-way ANOVA with family income as independent variable for awareness related to regulating bodies does not return significant results as witnessed with awareness of regulations also. Caste and merit of students are found to affect their awareness related to the NAAC, as shown by Table-6.11. Higher mean and lower standard deviation for awareness of General caste students related to the NAAC indicate social advantage in awareness for them. Students with 70-80 percent marks, grouped as middle, are more aware than students with higher and lower marks. The students with middle or average merit seem to be very competitive and hence more aware of the

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[95] The Bill to replace the MCI has been tabled in the Parliament.

196

NAAC while students with higher merit are more assured of their capability. Students with lower merit appear to be suffering from lack of information availability, along with students from non-general castes. Awareness related to regulations or regulating bodies is generated not only from specific sources of information, but also from inter-personal interactions and social networks.

Table-6.12: One-way ANOVA for Awareness related to Regulating Bodies				
Caste				
Regulatory Bodies	Central Tendency	General (N=206)	Non-General (N=101)	F-Statistic
NAAC	Mean	.82	0.70	5.54**
	S.D	0.38	0.46	
ICAA	Mean	0.49	0.39	2.7
	S.D	0.50	0.49	
UGC	Mean	0.94	0.90	1.69
	S.D	0.23	0.30	
AICTE	Mean	0.86	0.74	6.36
	S.D	0.35	0.35	
MCI	Mean	0.75	0.71	0.42
	S.D	0.44	0.45	
Degree(s) of Freedom: Between Groups-1, Within Groups-306				
Marks obtained in last examination				
		Low (N=132)	Middle (N=88)	High (N=82)	F-Statistic
NAAC	Mean	0.77	0.89	0.74	3.31**
	S.D	0.43	0.32	0.43	
ICAA	Mean	0.45	0.42	0.52	1
	S.D	0.50	0.50	0.50	
UGC	Mean	0.92	0.95	0.96	0.86
	S.D	0.27	0.21	0.19	
AICTE	Mean	0.81	0.86	0.84	0.55
	S.D	0.39	0.34	0.37	
MCI	Mean	0.72	0.76	0.78	0.55
	S.D	0.45	0.43	0.42	
Degree(s) of Freedom: Between Groups-2, Within Groups-299				
Source: Students' Survey				

Day to day Management of HEIs

Studying in an HEI provides opportunities to experience the functioning of the HEI as a stakeholder and leads to formation of perceptions, and changes in exiting perceptions. These experiences come from spending time in campus of HEIs and on websites of HEIs as well. Students need to interact with HEI management for day to day purposes and also feel the need for using the websites of their HEIs. There can be

many purposes of using websites for current students. Some of them are depicted in Figure-6.12 below.

Figure-6.13: Uses of Websites of present HEIs

Source: Students' Survey
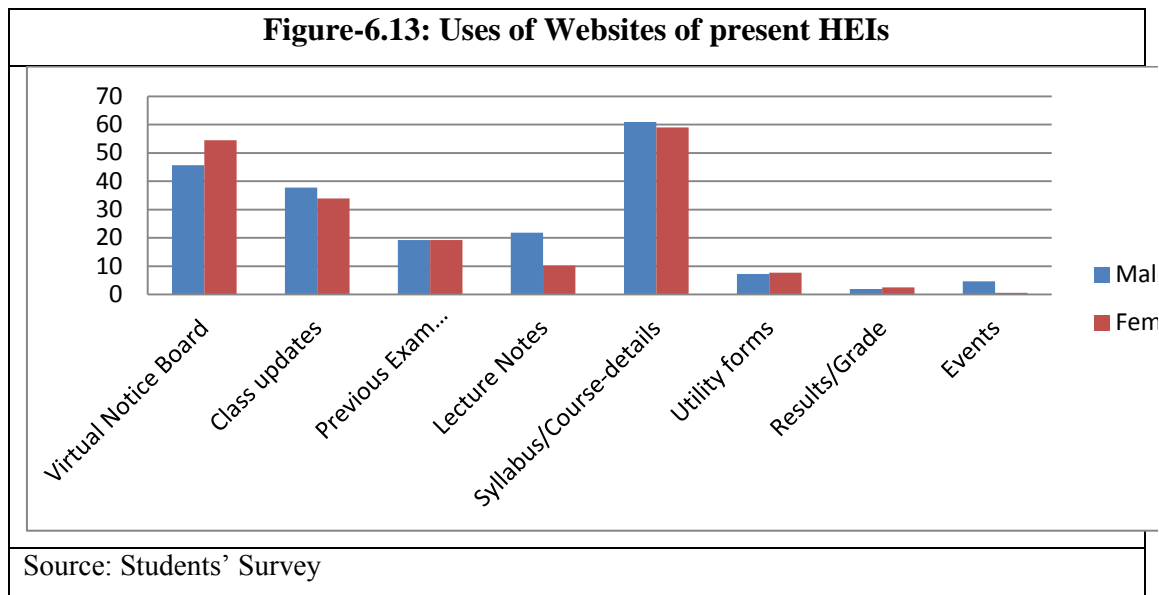
As search is guided by goal of choices to be made, different visitors use websites of HEIs for different purposes. Students enrolled in HEIs require information related to their day to day activities in HEIs while those seeking admission would seek information related to courses, fees, academic and physical infrastructure etcetera. Websites of HEIs are mostly used for details related to courses and syllabus. While this appears important for prospective students as well, the use of websites for this purpose remains the most for the current students. The second most reported use of websites is for looking up notices there. The third most reported use is quite close to the second one in purpose, that is, updates related to classes. Combining the second and third use of websites, it can be said that websites are sources of information related to day to day management of the HEIs. Male students use websites for details related to syllabus, courses, lecture notes and class updates more than female students. Use of websites as virtual notice board of HEI is more reported by female students than male students. The differences of use by male and female students are significant for lecture notes and events. One-way ANOVA for these two uses are significant with F-statistic 7.84 and 4.87[96]. One-way ANOVA with caste, merit (marks obtained in last examinations) and family income as independent variables do not return significant results.

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[96] Degrees of Freedom: Between groups-1, within groups-305

198

As awareness is generated from interactions and processes, perceptions of students after admission are also affected by their experiences at the HEIs. With respect to their day to-day experiences, their perceptions related to various attributes of the HEIs might undergo changes, depending upon the correctness and fineness of information available to the students before admission. One such attribute related to governance of the HEIs is perception of students related to day to day management of their HEI. Figure-6.13 presents changes in perceptions of students related to management of their HEIs. As evident from Figure-6.13, female students do not report much change in their perceptions as compared to male students. While gender appears as one of the variable affecting perceptions related to management, it encourages further investigation for factors affecting such changes. Changes in perceptions related to day to day management can be affected by perceptions related to other attributes of the HEIs and background of the students. A logistic model is attempted to trace such factors.

Figure-6.14 : Change in perceptions related to Day to-day Management (N=307, in percentage)

Source: Students' Survey
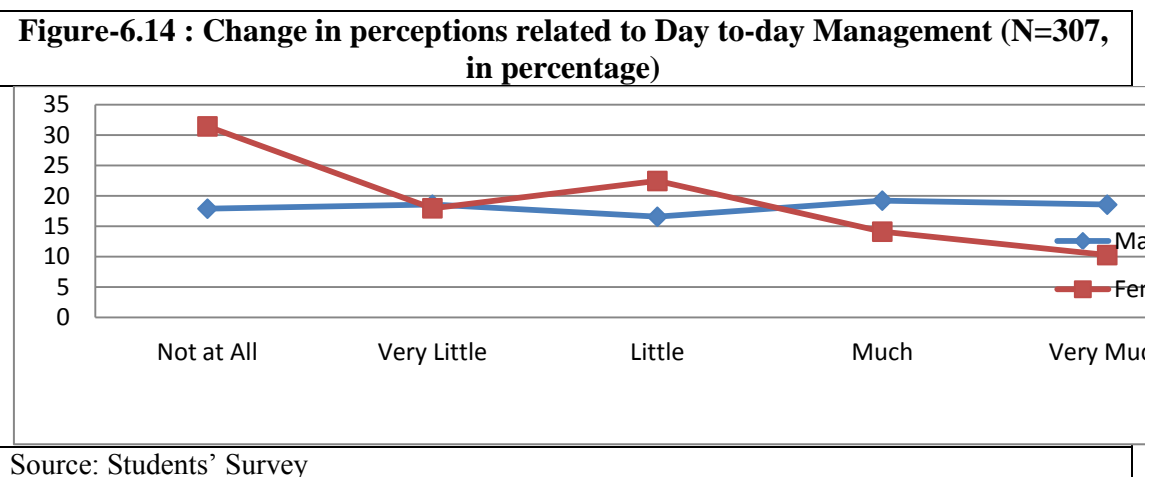
Determinants of change in perception related to day to day management

Specification of the Model:

The dependent variable for the proposed logistic regression is change in perception related to day to day management of the HEIs. The exploratory model specification is proposed as follows-

$Ldlymngmnt_i = f\{ CI_{ij}, S_{ij}\}$

Where $Ldlymngmnt_i$ is perception related to day to day management of HEIs

CI_{ij} is vector of variables denoting change in perception of students related to attributes of HEIs.

S_{ij} is vector of variables denoting the characteristics related to students

199

A list of variables for the above mentioned vectors is given below-

Table-6.13: List of variables for logit model for Perception change related to day to day Management				
Serial No	**Name/Code**	**Label**	**Nature**	**Type**
1	ldlymngmnt	Perception related to day to day management of HEIs	Dependent	Binary (No=0 and Yes=1)
2	PhyInfra_AsExpctd	No change in perception related to Physical Infrastructure of HEIs	Independent	Binary (No=0 and Yes=1)
3	Enrld_WB	Student being enrolled in the present course without any break between the previous and the present course	Independent	Binary (No=0 and Yes=1)
4	ClubForum_MuchChng	Much change in perception related to Club and Forums for students at HEIs	Independent	Binary (No=0 and Yes=1)
5	CrsRng_MuchChng	Much change in perception related to range of courses offered at HEIs	Independent	Binary (No=0 and Yes=1)
6	JobPrs_MuchChng	Much change in perception related to Job prospects	Independent	Binary (No=0 and Yes=1)
7	Gender	Gender of the respondent	Independent	Binary (No=0 and Yes=1)
8	General	Caste of the respondent	Independent	Binary (No=0 and Yes=1)
9	Hostel_Prsnt	Whether the student resides in hostel at present	Independent	Binary (No=0 and Yes=1)
10	LS_Stdnts	Students with less than 70 percent marks in the last examination	Independent	Binary (No=0 and Yes=1)
11	MS_Stdnts	Students with 70 to 80 percent marks in the last examination	Independent	Binary (No=0 and Yes=1)

Some of the iterations of regression exercises are as follows-

R.7.1: logit ldlymngnt=f{PhyInfra_AsExpctd   Enrld_WB   ClubForum_MuchChng CrsRng_MuchChng JobPrs_MuchChng Gender General Hostel_Prsnt MS_Stdnts LS_Stdnts}

R.7.2: logit ldlymngnt=f{PhyInfra_AsExpctd   Enrld_WB   ClubForum_MuchChng CrsRng_MuchChng JobPrs_MuchChng Gender General Hostel_Prsnt MS_Stdnts }

R.7.3: logit ldlymngnt=f{PhyInfra_AsExpctd   Enrld_WB   ClubForum_MuchChng CrsRng_MuchChng JobPrs_MuchChng Gender General Hostel_Prsnt }

R.7.4: logit ldlymngnt=f{PhyInfra_AsExpctd   Enrld_WB   ClubForum_MuchChng CrsRng_MuchChng JobPrs_MuchChng Gender Hostel_Prsnt }

R.7.5: logit ldlymngnt=f{PhyInfra_AsExpctd   Enrld_WB   ClubForum_MuchChng CrsRng_MuchChng JobPrs_MuchChng Hostel_Prsnt }

R.7.6: logit ldlymngnt=f{PhyInfra_AsExpctd   Enrld_WB   ClubForum_MuchChng CrsRng_MuchChng JobPrs_MuchChng }

The results of these exercises are presented in the following Table-6.14

Table-6.14: Results of Logit regression (R.7.1 to R.7.6)						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ldlymngnt	ldlymngnt	ldlymngnt	ldlymngnt	ldlymngnt	ldlymngnt
PhyInfra_AsExpctd	-1.300***	-1.280***	-1.271***	-1.205***	-1.209***	-1.234***
	(0.372)	(0.373)	(0.377)	(0.374)	(0.372)	(0.368)
Enrld_WB	-0.804**	-0.777**	-0.797**	-0.798**	-0.827**	-0.808**
	(0.336)	(0.334)	(0.333)	(0.330)	(0.324)	(0.319)
ClubForum_MuchChng	1.060***	1.046***	1.080***	1.075***	1.096***	1.074***
	(0.355)	(0.355)	(0.347)	(0.344)	(0.340)	(0.335)
CrsRng_MuchChng	0.880**	0.894**	0.903**	0.921**	0.991***	0.950***
	(0.389)	(0.387)	(0.383)	(0.380)	(0.371)	(0.360)
JobPrs_MuchChng	1.060***	1.072***	1.052***	1.092***	1.094***	1.139***
	(0.335)	(0.336)	(0.334)	(0.328)	(0.325)	(0.321)
Gender	-0.431	-0.399	-0.396	-0.315		
	(0.340)	(0.339)	(0.336)	(0.322)		
General	0.350	0.414	0.369			
	(0.353)	(0.352)	(0.348)			
Hostel_Prsnt	0.350	0.399	0.375	0.354	0.361	
	(0.319)	(0.317)	(0.315)	(0.313)	(0.311)	
MS_Stdnts	-0.487	-0.344				
	(0.437)	(0.382)				
LS_Stdnts	-0.269					
	(0.384)					
Constant	-0.688	-0.960**	-0.999**	-0.801**	-0.964***	-0.767***
	(0.524)	(0.421)	(0.418)	(0.399)	(0.360)	(0.296)
Observations	259	259	259	259	259	263

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results are hetero-robust. R.7.6 is the model with McFadden pseudo R2 more than 0.2 and confirming to linktest. The results of the linktest which are used for verification of specification error, if any, are presented in Table-6A-14 in the appendix. The results of the R.7.6 can be interpreted as follows-

The logit model takes the form:

Logit(p/1-p)= -0.767 +1.139JobPrs_MuchChng +0.95CrsRng_MuchChng +1.074 ClubForum_MuchChng -0.808 Enrld_WB -1.234 PhyInfra_AsExpctd

Where p is the probability of change in perception related to day to day management of HEIs

(i)   JobPrs_MuchChng: The coefficient of the parameter is 1.139. So, we expect a 1.139 increase in the log-odds of the dependent variable if the respondent feels much change in job-prospects.

(ii)   CrsRng_MuchChng: The coefficient of the parameter is 0.95. So, we expect a 0.95 increase in the log-odds of the dependent variable if the respondent feels much change in the range of courses at offer at HEI.

(iii) ClubForum_MuchChng: The coefficient of the parameter is 1.074. So, we expect a 1.074 increase in the log-odds of the dependent variable if the respondent feels much change with regard to the clubs and forums at HEI.

(iv)   Enrld_WB: The coefficient of the parameter is negative. So, a decrease of 0.808 is expected in the log-odds of the dependent variable if the student happens to be regular student with no break whatsoever between the previous and present course.

(v)   PhyInfra_AsExpctd: The coefficient of the parameter is negative. So, a decrease of 1.234 is expected in the log-odds of the dependent variable if the student finds physical infrastructure of the HEI as expected before admission.

Summary of Results: Changes in perception are related to attributes of HEIs leading to change in perception related to day to day management of HEIs. When students find little or no change in attributes like physical infrastructure, clubs and forums for students, job-prospects after study and range of courses being offered, they are less likely to report changes in perceptions towards management of HEIs. While background of the students such as gender, caste, merit (marks obtained in last examination) do not appear to be significantly affecting such perceptions, breaks in

enrolment, of any kind, seem to be significant determinant of perceptions related to management. Students enrolling after breaks in study might have higher expectations and awareness than those without any breaks in their study. The changes in perceptions related to attributes related to HEI are instances of information asymmetry on one hand and indicate demand for such information from HEIs. It is, therefore, necessary to corroborate the existing information asymmetry from sources of information. In the next section, a discussion on information related to above attributes available on websites of HEIs is presented along with compliance of regulations by the HEIs.

6.8 Summary of Findings

Female students come from families with comparatively richer backgrounds.. Evaluation of alternatives by girl students depends on their parents willingness and their self-merit. These two findings indicate hardships faced by female students in entering HE. Evaluation of alternatives by UG students also depends on their parents willingness and self-merit. They also seem to discuss with relatives more as compared to PG students. Gender also plays role in rating family members on computer literacy. Father and brother(s) are rated better than mother and sister(s). This also indicates structural and social biases in provisioning of computer education or education to girls. Career or job-prospects is the most reported motivating factor to pursue HE. Caste-wise variation observed in listing motives for HE. Preparation for admission to present course started during the last year of the previous course. Awareness of category of HEIs among respondents is not uniform. It depends on kind of HEIs-deemed and private and efforts of students to seek information for other attributes. The mismatch in categories hints the existence of information overload. Changes in perceptions related to facilities t HEIs, indicate information asymmetry. They are related to attributes of HEIs leading to change in perception related to day to day management of HEIs. When students find little or no change in attributes like physical infrastructure, clubs and forums for students, job-prospects after study and range of courses being offered, they are less likely to report changes in perceptions towards management of HEIs.

Chapter 7

Summary and Conclusion

7.1 Introduction

In a country like India, the third largest economy, the seventh biggest country in size, the second most populated country and also the second largest HE system in the world; the vastness adds to the difficulties in choice and decision making. The significance of the study becomes more prominent from the fact that despite such a large system and huge population of potential students, the GER is still hovering around 25 percent. The attempts to commoditise Education in general and HE in particular are still continuing. Though private participation in HE is as old as the history of modern HE in India, the recent surge in private participation in HE finds resonance with policy prescriptions since the adoption of the new economic policy in the 1990s, which gave birth to the dominance of economic reforms in policy making. The privatisation of HE, which implies the application of market principles in the operation and management of HE, is on the rise in the wake of the new economic policy. Publicly funded HEIs are being pushed to earn resources.

The prospective students to be able to make efficient choices need to gather information relating to HEIs. This helps them to realise their choices in the light of their paying capacity, capability and other socio-economic conditions and qualifications. Here, access to information becomes important for the students to be able to evaluate the alternatives and to decide among the alternatives based on the purchasing power in hand and their credential backgrounds. Accessing information itself entails cost and demands capability to comprehend institutional information systems. Thus, affordability in terms of purchasing power and capability attains more importance in view of unravelling the underpinnings from the demand side. Websites of HEIs can provide information to whoever visits the website at any point of time. Nowadays, with the growing popularity of Internet, websites of the HEIs have become dynamic sources of information. Their dynamism seeks to incorporate expectation of websites to be up to date (with information updates) and being made continuously available. The websites of HEIs act as effective sources of information for all within and outside institutions and as signalling devices for the institutions. The information furnished by the websites of HEIs to the students signal the quality of

education through academic infrastructure and quality of the faculty, the nature and degree of strength of governance structure, the quality of the peer group and other related attributes of the institutions such as transparency and governance. Though the area is scantly researched, Stack (2016) provides a good understanding of strategy making by websites of HEIs.

This final chapter presents summary of findings with respect to the eleven research questions raised for this research.This starts with brief introduction to the research and reflections from organisation and review of literature. The research questions, presented in the first chapter, are classified under three broad segments which are- (i) information processing and sources (websites), (ii) context and backgrounds of HEIs, and (iii) choice and decision making by students. The research outcomes will also be presented under these three segments. This will be followed by the discussion on contributions of this research to knowledge and strengths of the study in terms of methodology, theoretical content and findings. Limitations of the study and suggestions for further research arising out of experiences and limitations will be presented towards the end of the chapter.

7.2 Importance of the present Research

The two studies conducted for addressing ~~answering~~ the research questions arising out of contextual background and gaps in literature sought to address the little researched area of choice and information. The studies were conducted in an important and critical phase in Indian HE in general and Indian society and polity in general. The phase is characterised with increasing penetration of information in the lives of people due to availability of ICT enabled devices and connectivity on one hand, and policies geared towards surveillance, accountability and transparency. The increasing quantum of information reaching people through various devices and applications has the potential to inform them for efficient choices, misinform or misguide them and also creating confusion and uncertainty.

7.2.1 Area of Study

The research draws its significance from the area it seeks to understand- choice and decision making in HE, a life changing goal for the students. Educational choices are not merely for consumption rather they are irreversible investments by the parents and the students. This irreversibility does not only arise due to features of education as a

good but the ancillary investments parents make to ensure better quality schools for their children such as buying a house near good schools (Hogan ,1997; p-133). Such investments are often lifetime decisions for parents who seek to ensure better college, marriage prospects, job-prospects and future of the generations to come. Parents and students look forward to HE with such immense expectations that understanding choice and decision making in HE appears to be one of the most important areas to be studied.In a large HE system with increasing marketisation as that of India, understanding choice of students attains crucial importance. Choice making is closely linked with resources-income and information. The interrelationships between these two resources are also very important for choice making.

7.2.2 Addressing the Gaps in literature

The research has attempted to fill the gaps in literature at four levels. At the theoretical level, an attempt to address the limitations of disciplines to look into the issue of choice and decision making has been made by bringing in perspectives from related areas and broadening the framework. The conceptualisation of the theoretical overview presented in the first chapter depicts the conceptualisation of information processing with inputs from economics, psychology and related areas. The understandings of rationality and choice have also been broadened with inputs from philosophy, psychology, economics and other related areas. The research problem takes into account the policy and regulatory mechanism and seeks to address the gaps in literature with respect to such studies. The research also tries to fill the gaps at the empirical level and with relation to the focus of the study. The existing literature focuses mainly at determinants of choice and decision making and recognises informational needs of the students. This research tried to study the process of information processing by students and that by HEIs through their websites to understand the process of choice and decision making with the broader framework as discussed above and bring out the interconnections. With this theoretical and empirical framework, the research focuses at websites of HEIs, important sources of information in the age of Internet.

The regulatory mechanisms in place to ensure transparency and accountability in HE, focus on websites as one of the platforms. While there are regulations in place, compliance with them has not been studied before. Understanding the differences across mode of financing of HEIs over implementation and compliance of regulations

has important implications for public private partnerships.Recognition of information is not limited to an instrument of better governance and essential for efficient choice-making rather it has been statutorily accepted as one of the rights of the citizens under the Right to Information. In a country where access to information is a right, its processing attains crucial importance for understanding any sector.

7.2.3 Contribution to Methods

The methodological innovation is drawn from the theoretical overview presented in the first chapter wherein the effort to understand information processing along with related concepts is presented. The study which seeks to trace trends and patterns also intends to explore the interconnectedness of the concepts and processes. The two surveys carried out are thus rooted in post-positivist framework. An indicator is developed to measure accessibility of links on web-pages of HEIs. The indicator is first of its kind and covers all relevant elements of accessibility mentioned above. The existing literature on websites of HEIs in particular and information seeking in general do not present attempts to study patterns and trends which influence information processing. The changing conception of rationality available from other disciplines has been incorporated in terms of theoretical framework which guides the methods. Observation of websites of HEIs was planned in accordance with the indicator developed. The plan of observation also sought to cover the dynamic nature of the websites. The survey covered degree awarding HEIs drawn at all India level. Stratified random sampling, ensured with MS-EXCEL, selected one-third of each category to represent Central, State and Private. The sample size of the survey was 223 one-third of the then total degree awarding HEIs. Collection of data for the Websites survey, which involved structured observation of the websites, was collected in two phases. The first phase of data collection focussed on information directly related to admissionand took almost four months from April to July. The timing for the first phase was crucial as most of the HEIs invite applications during this time. The second phase lasted for seven to eight months and focussed on remaining contents of websites. Online survey of questionnaire was carried out during the second phase of the Websites survey to have comparable data. The questionnaire utilised snowballing to include variation in characteristics of respondents. The two studies seek to triangulate two sides of information processing- supply and demand for information.

7.3 Reflections on literature

The immense presence of information around us is understood differently by scholars of different disciplines. Bayly (1996), a Cambridge historian, views the use of information in its various facets such as literacy, dance, music and other forms of arts as instrument with which civilisations can be distinguished from each other. These facets of information and their use have also led to the development and management of different information systems by the rulers, evident in the form of intelligence services and surveillance mechanisms even these days (Bayly, 1996; p-4).Vedral (2010), a physicist, looks into the reality as manifestations of information in "*known knowns, known unknowns and unknown unknowns*" in the universe. The manifestations of information are studied with quantitative and qualitative approaches. Natural scientists take interest in quantum of information and approach it with syntactical dimension. Shannon (1948) is credited with formulation of mathematical association of information and uncertainty. Shannon & Weaver (1949) propounded the Mathematical theory of Information which became popular as Information Theory.

Philosophers like Floridi (2010) find the Information Theory to be a misnomer as it neglects the other most important dimension of information-meanings. Social Scientists take interest in meanings, that is, qualitative manifestations of information and approach it with semantic dimension.Thus the survey brings forth the differences in understanding of information in physical form with respect to information with meaning in terms of their importance in choice making.Unlike the notion of uncertainty and its association with information in natural sciences, social sciences differ in conceptualisation of the terms. From the semantic dimension, another idea of uncertainty prevailed in philosophy starting with Socrates, Plato to Kant. This idea suggested that "the more we gain insights into the mysteries of nature, the more we become aware of limits of our knowledge about things as such are" (Tannert et al, 2007). This notion of uncertainty raises question on information as a measure of uncertainty and as a means of reducing uncertainty. This also indicates some kind of limitation on utilisation of information on one hand and some sort of cognitive situation with increasing information. Kuhlthau (1993) presented how excess information after a certain point might increase uncertainty. A U-shaped curve, thus obtained, explains relationship between uncertainty and information. This

understanding of uncertainty brings forth the importance of attention and ordering of information so as to make it easier to comprehend.

The understanding of uncertainty finds resonance in the cognitive approach to decision making, known as Information processing which brought forward the importance of cognitive architecture of the human mind (Workman et al, 2009). The utilisation of the approach has not been limited to cognitive science or psychology rather has found relevance in the study of decision making at individual and organisational levels by the scholars of various disciplines such as political science, management, and economics. The relevance of the approach stems from the dimension it adds to understanding of rationality due to environmental or external constraints with respect to the cognitive capabilities.

In Economics, rationality has been one of the cornerstones for understanding choice. Philosophers like Aristotle, Hume and others have understood choice as involving desire and reasoning and the two being related, economic theory has traditionally focussed more on reasoning and has assumed economic agents to be rational in the sense that they optimise their objectives. The optimisation process itself consists of availability of perfect information on the part of all agents and ordering of preferences. Desires appear to be subsumed under preferences of agents which are assumed to be exogenous, consistent and transitive. Thus, reason drives desire in economic theory. After the seminal works by Simon (1955, 1974), Kahneman (2011) and Traversky (1982), the conceptualisation of rationality changed from substantial to procedural and role of information processing became prominent.The interrelationship between reason and passion in forming choice is delineated to understand the role of rationality and preferences. This understanding provides background for discussion on rationality and behavioural economics.

The importance of information for choice and decision making was known to economists as evident from works of Adam Smith, Knight and Keynes but it was not given its due place in theory. Hayek (1945) and his colleagues at Chicago, Stigler (1961) and Becker (1964) contributed significantly in assigning importance to information in choice and decision making. With contributions from Akerlof, Spence and Stiglitz since the 70's, information asymmetry has marked its place in economic literature. The developments in the area of information processing and information asymmetry have highlighted the role of information search by the consumer. Information is sought to satisfy some goal(s). The purposeful information seeking

leads an individual to interact with people, going through printed materials and browsing digital media like the Internet. Since goals are pursued with respect to some context, it is the context that guides the information seeking process. User goals are the motivating factors in information seeking process, as discussed in the previous chapter. Studies after 1977 identified indices for search activities for different kind of goods as different goods associate with themselves attributes leading to different goals.

Information and HE both have private returns associated with them along with externalities. With limitations on understanding, information also has decreasing marginal returns. Information search by a prospective student also become important with experience good character of HE. While HE is a quasi-public good, the market for HE is uniquely characterised with labour-intensive, cost disease, selection competition, customer-input technology and absence of specific production function.

7.4 Summary of Findings

This section would summarise the findings with respect to the research questions mentioned in the first chapter. As the research questions are categorised under three categories, the findings are also summarised in the same manner.

7.4.1 Information processing from Websites of HEIs

The websites of HEIs act as their virtual representation. The choice of domain names by the HEIs in the virtual world is not independent of their mode of funding. For example, while most of Central and State HEIs use domain name .ac.in, only 35.8 percent Private HEIs use the domain name .ac.in.Language of websites indicates homonisation or tendency to globalise. Central HEIs appear to be more inclusive as they provide options for full/partial translation. The provision of translation available from websites of the Central HEIs seems to be driven by language policy of the Union Government of India. The adherence with policies will also be discussed under governance section.

The Central HEIs use most of the space of their homepages for links while the Private HEIs leave most of the space of their homepages to be used for other contents such as rotating contents and pictures. This indicates the intensive use of folds for displaying pictures-static and dynamic by the private HEIs. These visual images help in highlighting certain intended features. Moreover, Private HEIs are comparatively

newer in comparison to Central and State HEIs. This seems closer to the findings of Nwagwu & Agarin (2008), who in their study of websites of 30 Nigerian universities found newer universities to be having fewer links comparatively. This might be because the new HEIs feel the need for branding more than the old ones who can reap on their reputation.Due to their established reputation of being comparatively older, Central HEIs do not feel the need to display external linkages for credibility. Also, Central HEIs have the highest visibility of authorship and currentness or up-datedness of information on their websites.

When the images are analysed, it is found that displaying events except convocation is dependent on mode of financing of HEIs.While the government funded HEIs showcase participation of dignitaries their private counterparts prefer to display their fondness to celebrities to attract young students.The Private HEIs display laboratory and library more often as compared to their government funded peers to attract the attention of the visitors.Most Private HEIs display information relevant for students through images. These images help in building up brand for the Private HEIs which are newer and differ in motives related to sustenance with the publicly funded HEIs. The use of contents in different form signal strategies of the HEIs. The Private HEIs have been observed to display images to attract students and using images as signals to provide information to them. These strategies can be gauged more accurately by observing dynamic contents of websites. Information related to admission, results, academic programmes are common elements of the dynamic contents. The discussion so far pertains to the first research question.

Apart from the content analysis of the websites, the study tried to find interrelationships between features of HEIs and their contents, and among the contents. This would address the second research question. The interrelationships are investigated by four logistic models for rank or quality, research at HEIs, submission of application form and the RTI. The predictors for the availability of these four links help in answering other research questions as well.

The logistic model for availability of rank or quality on websites shows location of HEIs in the eastern region, skill development courses being offered at the HEIs, indicator for authorship of website, and indicator for curriculum vitae of faculty as significant predictors. The eastern region also appears as a significant predictor in the students' survey for awareness of students related to the category of their HEIs. These two results indicate that the information processing by HEI can also be affected

by their location. Such interconnections of the results from the two surveys indicate possibility of generalisation of the results.

The logistic model for availability of research carried out at HEIs shows indicators for site-search, age of HEI, indicators for faculty specialisation and alumni, number of links per fold, courses on management and Indian languages offered at HEIs as significant predictors. As presented under discussion on navigability, generally all HEIs are poor in providing such links. However, State HEIs are found to be leading in providing links for site-search than the other two-Central and Private. Central HEIs are comparatively older and Private ones are comparatively younger. When age of HEIs is a significant predictor of availability of information on research, the age gap of HEIs appear to be a decisive factor. The number of links per fold varies significantly across HEI of the three categories. The results are explained in the fifth chapter. The predictors explain how HEIs showcase their output on websites. Another such use can be viewed from the link related to submission of admission form. Submission of Admission form also acts as proxy for level of E-Governance at HEIs. It has significant associations with indicators for prospective students, email facility at HEI, application fees to be submitted through cash, link for NRI or international students and management courses offered at the HEIs. The two models taken together answer the third research question.

7.4.2 Context and background of HEIs

The differences in terms of assistance in translation, using web-pages for displaying dynamic contents emit signals to prospective students and the significant differences with respect to predictors of the three logistic models summarised above; show the differences among HEIs of the three categories. These differences can also be traced from analysis of data pertaining to the Students; survey described in the last chapter. The results will be summarised in the following sub-sections and would substantiate the answer to the fourth research question. While we have already observed the role played by the location of HEIs as significant predictor availability of information or link for rank or quality, the roles played by the other characteristics of the HEIs would be summarised in ensuing discussion and the fifth research question would also get answered. The sixth and seventh research questions are discussed in the sub-section on governance where we discuss the results from the studies together.

7.4.3 Information and experiences of students

Information processing refers to the totality of activities geared towards collection, prioritisation and interpretation of information for specific goal(s). Information processing experiences of students shed light on inherent process and factors influencing accessing information and understanding use of information with respect to desired goal(s). The online questionnaire survey of students intended tounderstand these perceptions and experiences. The analysis of date presented in the sixth chapter reveal important results related to information processing and choice in HE. The results show that female students come from families with comparatively richer backgrounds and with higher marks. Their comparably well off background actually hints the difficulties that female students in general have to go through to enter HE. This gets reflected by the fact that despite differences in family income, male and female students report same sources of managing expenses, family support being the most reported by both of them. With family income and family support to pursue HE, competence of family members also influences choices of students. While family members might dominate the decision making, as observed in the case of female students, they also help as sources of information or in searching information. Parents influence the decisions of students as reported by female students and students at the UG level. At the UG level, students have revealed that they discuss with their relatives to seek help in evaluation of alternatives available to them.

In such situations, competence of family members become very important as choices of students depend on them. Competence of family members, as gauged with help of the perceptions of students related to computer literacy of their family members, reveal significant association with family income and differences across levels of income. Students from families with employed mothers rate their mothers higher on computer literacy. In general, the competence of family members differs across gender; even female students rate their brothers better than them in terms of computer literacy. Also, female students rate themselves lower than male students in terms of information seeking activities.

Family background also influences the perceptions related to cost of accessing information as significant F-statistic is obtained for the cost of accessing information through various means (physical sources to the Internet) and family income. The implications are not merely economic in sense of supporting the expenditure related to

cost of accessing information rather it can be seen from sources of motivations revealed by the students. Career or job-prospects is the most reported motivating factor to pursue HE. Caste-wise variation observed in listing motives for HE. Educated family members have been reported as one of the sources of motivation for pursuing HE and the results show significant differences across gender and caste groups. The importance of family background in choice making has been recognised in literature (Becker, 1964; Swell & Shah, 1978; Chapman, 1981). The roles have been conceived in supporting and motivating choices. This study finds the role of family in information processing as sources of information and associates in the process. Pathak (2008) also found family members as important sources of information for engineering students.

As the sample consists of female students with higher marks and coming from well-off families, the influence of merit on choices goes along with family income. Significant differences have been obtained for evaluation of alternatives by students, where they report self-merit as one of the important factors for evaluation of alternatives. Merit also helps in evaluating reputation of the HEIs. Stigler (1961) stressed the importance of reputation in economising cost of search. Students tend to evaluate reputation of alternatives (the HEIs) with the help of their academic aptitude (merit), discussion with relatives and discussion with teachers at their previous institutions. The students with higher merit are more likely to get admission in HEIs of their preference. The logit model for change in reputation as dependent variable establishes present HEI being one of the top three choices as one of the important predictors for change in perception of students related to reputation of their HEI. The other predictors for change in perceptions related to reputation are-gender, expectations related to campus environment, alumni, international collaborations, and mode of funding of the HEI.

As male and female students rate themselves differently in terms of information seeking and come from different backgrounds, the differences in their perceptions are expected. Mode of funding of HEIs guides institutional objectives, as also observed in the fifth chapter, and motivates the HEIs to furnish information that suits their objectives. Students from Private HEIs are more likely to report changes in their perceptions related to the reputation of their HEIs. Owing to the experience good character of the HE, they understand the true reputation (quality of HE) only with their experience. Studying the behaviour of the HEIs with respect to information

processing has been one of the objectives of the two studies (Websites survey and Students' survey) and has found to be achieved.

Understanding information processing includes search behaviour, evaluation of information and interpretation as well. Information in excess or unmanageable quantity or with incomprehensible quality increases uncertainty Kuhlthau (1993). A situation of information overload, beyond the cognitive capacities of information seeker, has been discussed in literature. An effort to understand the existence for this situation for students of HE has been attempted by modelling their awareness of their HEIs. Awareness related to two variables related to the HEIs- location and categories of the HEIs are investigated.The responses are matched with the help of address of the HEIs and name of the HEIs reported by the students, as explained in the sixth chapter. While a significant difference across gender is observed for location of the HEIs, the logistic model for matching of categories of HEIs provides location of HEI (Eastern region as dummy variable), time spent in searching information before admission, duration of use of the Internet by students and characteristics of the HEIs (mode of funding and HEIs being deemed to be universities) as significant predictors. Thus, awareness is an outcome of efforts of students to look for information and institutional propensity of furnishing information. HEIs located in the eastern region of the country have also been observed as significant predictors for availability of rank or quality related information or link on websites of the HEIs. Mode of funding has been an important variable for the two studies. Status of deemed to be university has also been significant predictor for availability of rank or quality related information or link on websites of the HEIs, and admission process pursued by the HEIs.

Thus, the awareness of students related to the category of their HEI indicates existence of some kind of gap in terms of information (asymmetry or overload) which prevents them to interpret this very simple, basic but very crucial information for them. The students' characteristics as predictors indicate the existence of information overload while institutional characteristics hint information asymmetry for students. Information overload might also be related to institutional characteristics if we broaden the interpretation and consider the results of other logistic models related to change in perceptions (reputation, day to day management, and the RTI).

The preference of primary sources for information has been reported by the students. The primary sources here refer to sources representing HEIs directly either

people known at the HEIs, brochures or the websites. Their experiences of information search reveal their preference for authenticity of information available with less time spent. The perceptions related to cost of accessing information, as mentioned above, are guided by their family backgrounds. Studies related to choice in HE have highlighted the role of background of students, institutional characteristics and information needs of the students but going deeper into the information needs and understanding the process of seeking information are additions to the existing literature by this research.

The discussion above deals with the process of information processing by the students. The way they plan, start thinking and searching for information. The results related to these aspects answer the eighth research question. The roles played by institutional characteristics- the location of HEI, HEIs being deemed to be universities along with mode of funding as indicated by Private HEIs being significant predictors for matching of categories of HEIs; explain the roles played by characteristics of HEIs. Moreover, reputation of HEIs itself acts as an indicator for economising on cost of searching and undergoes changes in terms of perceptions after admission. These pertain to the ninth research question. The tenth research question has adequately been addressed with the understanding of search behaviour, evaluation of alternatives and roles played by background of students and their characteristics. The last and eleventh research question finds answers in change in perceptions of students. The changes in perception related to day to day management presented below and the variables representing changes in perceptions as predictors adequately answer the eleventh question.

7.4.4 Governance of HEIs

The two studies conducted tried to look into the governance of HEIs. The Websites survey attempted to gauge availability of contents pertaining to E-Governance on websites and interrelationships of these contents with other contents. The Students; survey sought to understand the perceptions of students related to day today management of their HEIs.

The indicators for the results of exams, telephone directory, placement information, notice and announcements, social media and RSS feeds, links specific to current students (named such), and library catalogue are significantly different across HEIs according to their mode of funding. These indicators are most useful for current

students in particular and any visitor of the website in general. Students also report use of websites of their present HEI as virtual notice board. The logisticmodel to trace predictors for change in perception of students related to day today management of their HEIs shows expectations related to job-prospects, clubs or forums at HEIs, range of courses, and physical infrastructure to be significant predictors. Apart from these institutional characteristic, enrolment background of student is also a significant predictor for their change in perception. Students continuing their education without any kind of break perceive the day to day management differently from their peers with some kind of breaks in study. These information asymmetries might lead to inefficient choices and even HEIs can utilise these asymmetries to cheat students depending upon motives of the HEIs.

While students undergo change in perceptions arising out of changes in their expectations related to institutional characteristics, openness or willingness of HEIs to provide information becomes important to understand with regard to governance. The Websites Survey reveals significant differences among HEIs across their mode of funding related to key indicators for E-Governance, such as, indicators of visibility for tenders, cells or office meant to redress grievance, the RTI and mandatory disclosures. The logistic model for availability of the link to RTI on websites shows indicators for hostel, person search on websites, equal opportunity cell, site search as significant predictors along with institutional characteristics (mode of funding and HEI being an affiliating university). While State and Private HEIs are more likely to violate the RTI guidelines by not providing any link for the Act on their websites, affiliating universities tend to follow as they have to maintain the responsibility of appeals under the RTI coming against the colleges affiliated to them. Central Universities by far have appeared as most law abiding in terms of the RTI and also following language policies of the Union Government. It might stem from their accountability to the Union Ministry and also to their comparatively better financial health. User-friendliness of websites, depicted by site search and person search options, predicts the availability of links for the RTI. HEIs with links for equal opportunity cell tend not to provide information related to the RTI indicating priorities in adhering to regulations. Hostel facility for students is an important indicator for HEIs to be sensitive to the information needs of the prospective students. Thus, a proactive HEI is more likely to adhere to regulations than those who are not sensitive to needs of the users of their websites.

7.5 Conclusion

The two studies find the roles played by characteristics of HEIs in information processing. The mode of funding of HEIs guides their use of websites as sources of information and also influences information processing by students and their experiences after admission. The adherence to regulations by HEIs is also predicted by their mode of funding as Central HEIs adhere to most of the regulations and guidelines including language policy and the RTI as compared to their State and Private counterparts. Other features of HEIs-being affiliating university and being deemed to be university also at as determinants of information processing through availability of links predicted by these features and the experiences of students at these HEIs. The location of HEIs is also found to be important variable in determining their governance and information processing. HEIs from the eastern region have appeared as predictors in both the surveys while those from the western region have appeared as predictors for submission of forms in the Websites survey. Along with these features, age of HEIs has also emerged as a significant variable determining the behaviour of HEIs.

Individual and family background of students affects their information processing. Individual characteristics of students include merit, gender and engagement of students in study without any break while family background consists~~mists~~ of family income and computer literacy (indicator for education). Students start searching for information during the last year of their previous course. Students rely mostly on primary sources which are directly related to HEIs such as people known at HEIs, brochures and websites of HEIs. Their awareness related to category of HEIs reveal extent of information asymmetry on one hand and possibility of information overload created by host of signals emitted by HEIs. The changes in perceptions related to key variables such as day to day management, job-prospects, courses, hostel facilities indicate add to the existence of information asymmetry and prove the lack of efforts on the part of HEIs to furnish information. The changes in perceptions might also result from load of information on the part of students limiting their cognitive capacities. Institutional characteristics of HEIs, such as mode of funding and their status as deemed to be universities, leading to changes in perceptions provide validity and generalisation to the findings.

7.6 Limitations and Suggestions for further research

Limitation of the Study

The study did not included colleges and focussed on degree awarding institutions for the sake of comparison. Students at the UG level are enrolled in colleges in large numbers. This requires a study focussed on websites of colleges planned specifically for them.

The online questionnaire survey utilised snowballing technique to reach at potential respondents. The sampling method did not cover social categories adequately. A stratified sampling with social categories as strata will be useful to study the variations across these categories.

Students at the three levels of enrolment UG, PG and Research might have different goals which might influence their information processing. Stratified sampling across the levels of enrolment might bring out the differences in motives and perceptions of students at the three levels.

Suggestions for further research

The limitations of the study suggest ideas for further research. Moreover, websites can be studied with respect to responses from students of the particular institutions.

Similarly, a list of HEIs can be collected from students survey and experiences of students can be juxtaposed with evaluation of websites of HEIs retrieved from the students.

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Appendix-I

Figure-1A: An Indian Delegation in an Australian University

Source: Reproduced from facebook wall of Dr. Narendra Thakur with kind permission.

Campus Computing Project

S. No.	Year	Title	Main Finding
1.	1994	Information Technology moves slowly into classroom	16 per cent of the courses use computer labs or classrooms, and 10 per cent use computer-based simulation and exercise. Survey data reveal that internet and CD-ROM will be an important source of content and instructional material.
2.	1995	Technology uses is introduced in college campuses	The per centage of college courses using e-mails and multimedia resources more than doubled. The technology revolution, much discussed in reality, is slow. The gradual movement of information technology resources into the curriculum and class room experiences is speeding up.
3.	1996	Instructional integration and user support pose continuing technology challenges	17.6 per cent of the institution focus on Enhancing/Expanding the campus network and financing the replacement of aging hardware and software. The survey data reflect the continuing problem faced to develop a viable plan for addressing their escalating technological needs, the budget model employed by most campuses force institutional officials to look for other resources, than using reserve fund.
4.	1997	More technology in curriculum, more Campuses, which impose IT Requirement and raise in student fee	Information technology has become an increasingly important component of the instructional and learning experience, across all fields and all types of institution. 40 per cent of the campuses participating in the survey reports having some type of computer instruction or IT competency requirement for all undergraduates.

5.	1998	Colleges struggle with IT planning	Campuses are doing more with technology, and they are doing it better than in the past. But the real challenge at most institutions is to improve resources and services, given both rising expectation and exploding demands. More campuses are using student fees to help cover IT cost(s). 45.8 per cent of the institutions participating in the survey report a mandatory student IT fee.
6.	1999	The continuing challenge of instructional integration and user support	The survey identifies that instructional integration is the most significant IT challenge, and providing user support was ranked as the second biggest challenge. Despite some dire prediction on both sides of the issue, the real future of technology in Higher Education is not about a winner taking all between high touch and high tech. Rather, what's ahead for most of the faculty and students is, some kind of hybrid learning experience in which technology supplements not supplants, both the content and discourses that have been part of traditional experiences of going to college.
7.	2000	Struggle with IT staffing	Campus officials place 'retaining current IT personnel, given campus competition, and helping IT personnel stay updated with new technologies' at the top of the list of 27 strategies. The survey confirms that the key IT challenge in Higher education involves people, not products.
8.	2001	E-Commerce comes slowly to the campuses	The campus community is still catching up on E-Commerce and E-Service issues: "Considering the wide array of electronic commerce and electronic service options routinely available to student and faculty in the consumer and corporate sector, it is clear that the campus community is two years behind in its E-Commerce/E-Serviceofferings".

9.	2002	Campus portals make progress: Technology Budget suffers significant cuts	The 2002 data indicate that web portals are finally making the transition from an abstract concept into a real institutional service. Gain on E-Commerce and E-Service issues. The survey provides clear indicators of major budget cuts underway across all sector of American Higher Education.
10.	2003	Campus policies address copyright issues; Wireless network show big gains	The survey data reveal that policies intended to stem downloading are most common at universities: almost 80 per cent of public universities and 77.5 per cent of private university have campus codes of conduct that focus on downloaded commercial content. In contrast, about two-thirds of all public private four-year colleges have code of conduct regarding downloaded commercial content. Only half of the community colleges participating in survey have campus policies that address the issue of unauthorised digital content on campus network.
11.	2004	Technology Budget gets some relief caution support for open source applications	Private colleges and universities seem to have fared a bit better with IT budget than their public counter part. 41.2 per cent of the private universities reported increased funds for academic computing, compared to 31.9 per cent of public universities. Support for Open Source is highest in university: roughly two-thirds of the respondents in public and private research universities affirms the "increasing important" role of Open Source.
12.	2005	Growing concern about campus IT security; Slow progress on IT Disaster Recovery Planning	The survey data go beyond the sporadic public resort about data or IT security incidents at individual colleges or universities. Only 57.4 per cent of the campuses report a strategic plan for IT disaster recovery. The growing concern about IT security, should be a reminder to all colleges and universities to lock down or update its

			disaster plan.
13.	2006	Wireless networks reach half of the colleges classrooms; IT security incident decline this past year	Wireless is a great thing, it fosters access, mobility and collaborative work among students and faculty. The percentage of colleges and university experiencing various security incidents and threat- stolen computer with confidential data, hack attack on campus network and various spyware and virus infection declined this past year.
14.	2007	IT security and Crisis management pose continuing challenges	In the wake of Virginia tech tragic event in 2007, many of the campuses are moving quickly to enhance and expand IT and communication resources and services as part of broader IT and campus crisis management plan. Wireless can be a wonderful resource for everyone in campus but there is continuing evidence from some faculty who would prefer that students do not hide behind their computer screen during class.
15.	2008	Campuses invest in Emergency notification	Given recent campus tragedies and natural disaster, campus officials have come to recognise that technology is an essential component of a comprehensive institutional crisis management strategy. The new IT budget reduction comes just as many institutions are beginning to recover from the budget cut that marked the economic downturn during the first year of current decade. The demand for technology resources and services are continuing to rise, even as the dollars supporting these resources, services and IT staff are cut from institutional budget.
16.	2009	IT budgets are down- Again!	Public institutions have been hardest hit by the current IT budget cut. 67.1 per cent of the public universities reported budget cut affecting central IT services for 2009, as did 62.7 per centof the public four-year

			colleges.
			The 2009 data point out that a small gain in number of campuses that are in compliance with the broad terms of the P2P provisions of the Higher Education Opportunity Act (HEOA) of 2008.
17.	2010	IT budget cuts are down; LMS strategies are in transition	The survey data provide a modicum of good news about money: fewer institution experiences budget cut this year than the last. The 2010 survey highlights the continuing transition in the higher education market for Learning Management System (LMS). The LMS market is a textbook example of a mature market with immature, or evolving technologies, and that's a recipe for volatility.
18.	2011	Big gains in going mobile; slow movement to cloud computing	Across all sector of higher education, the 2011 survey documents big gains in the promotion of campuses that have activated mobile apps. Private universities also posted big gains on going mobile. Colleges and universities are playing catch up with consumer experience. Students come to campuses with their smartphones and tablets, expecting to use mobile apps to navigate campus resources and use campus services.
19.	2012	A mixed assessment about the effectiveness of campus IT investments; More campuses go mobile and slowly to cloud, while fewer experience IT budget cuts	Across all sector of higher education, the survey suggests another year of big gains in the promotion of colleges and universities that have activated mobile apps. Among public universities, four-year campuses and community and community colleges, about 40 per cent of them reported reduction in the central budget for IT fall 2012, down dramatically from 2011. Private/non- profit institutions continue to fare better than their public counterpart.
20.	2013	Campus IT officers affirm the instructional	The focus on IT services becomes even more interesting when viewed in the

		integration of IT as their top priority, offer mixed on IT effectiveness and outsourcing for Online Education	context of how campus IT officers assess the effectiveness of campus investments in information technology. 67 per cent view the campus IT investment to supportlibrary resources and services as 'very effective', followed by administrative information systems 64 per cent, on-campusteaching and instruction 62 per cent student services 54 per cetn,and academic support services 51 per cent. In contrast, 25 per cent cite the IT investment to support analytics asvery effective, followed by alumni activities 27 per cent, development efforts 31 per cent, and online courses 42 per cent. The numbers regarding the effectiveness of IT investments tosupport research and scholarship understandably vary by sector, highest in universities (almost 50 per cent) and lowest in private four-year colleges (30 per cent).
21.	2014	Campus struggle to provide effective user support and IT training, and also access to Disabled Students	While many IT officials feel that their institutions are making a significant effort to provide access to digital curricular resources and services to disabled students, there is often a large gap between what is offered or available and what the current law mandates.

The focus on IT services becomes even more interesting when viewed in the context of how campus IT officers assess the effectiveness of campus investments in information technology.

Two-thirds (64 per cent) view the campus IT investment to support library resources and services as 'very effective', followed by administrative information systems and on-campus teaching and

Instruction (63 per cent), student services (55 per cent), andacademic support services (53 per cent). |
| 22 | 2015 | Great faith in the instructional benefits of digital technologies; Great expectations for | New data from the 2015 Campus Computing Survey reveal that

college and university CIOs and senior IT |

		rising use of OER	officers believe that digital technologies do (or will) have a significant impact onstudent learning and outcomes. A large number (94 per cent) of the fall 2015 survey participants, who represent 417 two- and four-year public and private colleges and universities, agree or strongly agree that "digital curricular resources make learning more efficient andeffective for students.'Similarly, most (87 per cent) report that
			'digital curricular resources provide a richer and more personalizedlearning experience than traditional printmaterials.'
23.	2016	Key campus IT issues: Personnel, instruction, budget, security and analytics	90 per cent of the survey participants report that 'senior campus leadership understands the strategicvalue of institutional investments in IT infrastructure, resources,and services' and 84 per cent report strong faculty support for 'the role of technology to enhance teaching and instruction,' these high levels of administrative and faculty support have not been sufficient to stem the recurring budget cuts experienced by too many institutions, especially public colleges and in particular community colleges.
			The 2016 survey data also highlight the role of student IT fees as a key source of funds for campus IT budgets.
			Private institutions are less likely than public colleges and universities to have a student technology fee, the student fees are higher in private institutions.
Source: Campus Computing Project (various years)			

Appendix III

Illustration of structured observation of websites

Variables	Entry details	Coding
Name of HEI	actual	
City/Town	actual	
State	actual	
URL	actual	
URL type	URL ending with…	.ac
Authorship	actual numbers of click of mouse to reach	available on homepage:0 and
P_Authorship	Centre=C, Left=L, Left Down=LD, Right Down=RD, Right=R, Right Up=RU,	
Currentness	actual numbers of click of mouse to reach	available on homepage:0 and
P_Currentness	Centre=C, Left=L, Left Down=LD, Right Down=RD, Right=R, Right Up=RU,	
AbtHEI	actual numbers of click of mouse to reach	available on homepage:0 and
P_AbtHEI	Centre=C, Left=L, Left Down=LD, Right Down=RD, Right=R, Right Up=RU,	
Why_HEI	actual numbers of click of mouse to reach	available on homepage:0 and
P_WhyHEI	Centre=C, Left=L, Left Down=LD, Right Down=RD, Right=R, Right Up=RU,	
CalEvnts	actual numbers of click of mouse to reach	available on homepage:0 and
P_CalEvnts	Centre=C, Left=L, Left Down=LD, Right Down=RD, Right=R, Right Up=RU,	
IniEWS	actual numbers of click of mouse to reach	available on homepage:0 and
P_IniEWS	Centre=C, Left=L, Left Down=LD, Right Down=RD, Right=R, Right Up=RU,	
Department/Centres	actual numbers of click of mouse to reach	available on homepage:0 and
P_Department/Centres	Centre=C, Left=L, Left Down=LD, Right Down=RD, Right=R, Right Up=RU,	
Dept/Centre E-Mail	actual numbers of click of mouse to reach	available on homepage:0 and
Affiliated Colleges	actual numbers of click of mouse to reach	available on homepage:0 and

Source: Tools developed by the researcher

Students' Questionnaire

Dear Respondent,

I, Binay Kumar Pathak, am a PhD student at Jawaharlal Nehru University, New Delhi. For all of us, pursuing Higher Education (HE) has been one of the most important decisions that we have undertaken. Our experiences of making choices and decisions regarding our course(s) and institution(s) (HEIs) has been crucial we often remember them in our day to day experiences. Through this questionnaire I seek to take you through your experiences and elicit your responses. The questionnaire consists of six sections. You will be taken to five of them on the basis of your journey of information search and choices. The five sections will appear as five pages on your screen. The questionnaire will take only 10-15 minutes to respond as most of the questions require click(s) of the mouse.

Your kind responses will help me to understand the process of choice and decision making for HE, the challenges faced by students and their expectations. I request you to help me to unravel the most crucial phase of the life of a student. I assure you that the identities of the respondents and institutions will be kept confidential.

Please click 'Continue' button at the end of each page.

Thank you in anticipation for your kind co-operation

N.B: HEIs stands for Higher Education Institutions (Universities and University level institutions)

Binay Kumar Pathak

Doctoral Candidate
Jawaharlal Nehru University
New Delhi-110067
binaykumarpathak@gmail.com

* Required

1. **I am a**
   Mark only one oval.

   ◯ Lady

   ◯ Gentleman

2. **My E-mail ID is**

   _____

3. **I belong to**
   Mark only one oval.

   ◯ General Category

   ◯ Schedule Caste (SC)

   ◯ Schedule Tribe (ST)

   ◯ OBC

4. **I manage my entire expenses through**
   Please feel free to add and mark more than one option
   Check all that apply.

   ☐ a scholarship

   ☐ giving tutions/coaching

   ☐ family support

   ☐ part-time job

   ☐ Other: _____

5. **I am young of**
   Your age please

   _____

6. **I am studying in**
   Please write the full name of your present institution with location

   _____

   _____

   _____

   _____

7. **My present address is**
   Please mention District and State along with village/town/city

   _____

   _____

   _____

   _____

8. **I have been inspired to pursue HE by**
   Please feel free to add and mark more than one option
   Check all that apply.

   ☐ feeling of achievement/self-esteem

   ☐ social status

   ☐ social networking/ search for new friends

   ☐ educated family members

   ☐ scope for financial security

   ☐ enjoyment of subject

   ☐ career/job-prospects

   ☐ peer influence

   ☐ Other: _____

9. **Before joining my present institution, I was**
   What were you doing before joining the present institution?
   Mark only one oval.

   ◯ having a break from studies

   ◯ preparing for professional examinations

   ◯ pursuing previous course/study

   ◯ working/employed

   ◯ Other: _____

10. **I am presently enrolled for**
    Mark only one oval.

    ◯ Under Graduate Programme (B.A/B.Sc/B.Com etc)

    ◯ Post Graduate/Masters Programme (M.A/M.Sc/M.Com etc)

    ◯ Research Programme (M.Phil/Ph.D./D.Phil etc)

    ◯ Other: _____

11. **The subject(s) I am studying is/are-**

    _____

12. **I decided my stream/subject(s) to study during**
    Please mark one of the following or add
    Mark only one oval.

    ◯ school days (before +2)

    ◯ higher secondary (+2)

    ◯ last year of the previous course

    ◯ study break/gap

    ◯ job/ employed status

    ◯ Other: _____

13. **My present Institution is a**
    Mark only one oval.

    ◯ Central University

    ◯ State University

    ◯ Institution of National Importance (like IITs)

    ◯ Private University

    ◯ Deemed to be a University (Govt. sponsored)

    ◯ Deemed to be a University (Private)

14. **My previous Institution was a**
Mark only one oval.

- ( ) Government institution
- ( ) Non-Aided Private institution
- ( ) Aided Private institution
- ( ) Charitable/Missionary/Trust
- ( ) Other: _____

15. **My previous and present Institution are located in**
Mark only one oval per row.

	Village	Town	City	Metro	Capital City
Present Instituion	( )	( )	( )	( )	( )
Previous Instituion	( )	( )	( )	( )	( )

16. **Most of my friends have been**
Mark only one oval per row.

	High Scorers	Average Scorers	Poor Scorers
Present Instituion	( )	( )	( )
Before joining present Institution	( )	( )	( )

17. **My total family income per month is**
Mark only one oval.

- ( ) Upto INR 15,000
- ( ) INR 15,001 to 30,000
- ( ) INR 30,001 to 50,000
- ( ) INR 50,001 to 75,000
- ( ) Above INR 75,000

18. **Computer-literacy ratings of myself and my family members are-**
in case of more than one brother/sister, rate the ones with better computer (cyber)-skills
Mark only one oval per row.

	Very Good	Good	Average	Poor	Very Poor
Mine (Myself)	( )	( )	( )	( )	( )
Mother	( )	( )	( )	( )	( )
Brother	( )	( )	( )	( )	( )
Sister	( )	( )	( )	( )	( )
Father	( )	( )	( )	( )	( )
Other significant family member/relative	( )	( )	( )	( )	( )

19. **My father is a**
Profession of your father

_____

20. **My mother is a**
Profession of your mother

_____

21. **I have been using Internet/www**
Please mark only one oval
Mark only one oval.

- ( ) after joining present course
- ( ) for few years before joining present course
- ( ) for a long time
- ( ) Other: _____

22. **Before joining my present course of study, I used to access internet/www from**
Please feel free to mark more than one option and add
Check all that apply.

- [ ] Home
- [ ] Hostel
- [ ] Cyber-Cafe
- [ ] Friend's Internet Access
- [ ] Relative's Internet Access
- [ ] Institution (where I studied)
- [ ] Smart-Phone/ I-Pad
- [ ] Other: _____

23. **I am aware of**
Mark only one oval per row.

	YES	NO
Prohibition of Unfair Practices Bill, 2010	( )	( )
Mandatory Disclosure for HEIs	( )	( )
Right To Information (applicable to HEIs)	( )	( )
E-Governance (National E-Governance Plan)	( )	( )

24. **As an Information-seeker (career and higher education) , I find myself as**
Mark only one oval.

	1	2	3	4	5	
Very active	( )	( )	( )	( )	( )	Very Lazy

25. **The percentage of marks I obtained in last examinations (public examinations-X, XII, UG, PG etc)**
Please mention the percentage equivalents of CGPA/GPA.
Mark only one oval per row.

	more than 90%	80-90%	70-80%	60-70%	45-60%	below 45%
Last public examination (+2, UG, PG etc)	( )	( )	( )	( )	( )	( )
Second last public examination(before the above one)	( )	( )	( )	( )	( )	( )

26. **For admission to my present course of study**
Please mark only one oval per row

Mark only one oval per row.

	School Days	On joining the previous course	During the last year of the previous course	During the year break/gap	while employed
I started thinking of admission from	◯	◯	◯	◯	◯
I started searching for information from	◯	◯	◯	◯	◯

27. **I am/have aware/heard of these agencies/organisations**
Please mark only one oval per row

Mark only one oval per row.

	YES	NO
National Assessment and Accreditation Council (NAAC)	◯	◯
Indian Centre for Assessment and Accreditation (ICAA)	◯	◯
QS World University Rankings	◯	◯
Times Higher Education World University Rankings	◯	◯
Shanghai Academic Ranking of World Universities	◯	◯
University Grants Commission (UGC)	◯	◯
All India Council for Technical Education (AICTE)	◯	◯
Medical Council of India (MCI)	◯	◯

Information Search for Higher Education

28. My sources of information on HEIs, before admission were
Please feel free to mark more than one option (as applicable to you) and rate them
Mark only one oval per row.

	Very Useful	Useful	I did not use/consult	Somewhat Useful	Not Useful
Brochures of HEIs (generally issued to provide specific information)	⬭	⬭	⬭	⬭	⬭
Prospectus of HEIs (generally available with admission forms)	⬭	⬭	⬭	⬭	⬭
Advertisements in Newspapers/Magazines	⬭	⬭	⬭	⬭	⬭
Teachers at previous Instituion	⬭	⬭	⬭	⬭	⬭
Parent(s)	⬭	⬭	⬭	⬭	⬭
Sibling(s)	⬭	⬭	⬭	⬭	⬭
Relatives	⬭	⬭	⬭	⬭	⬭
Social Networking sites	⬭	⬭	⬭	⬭	⬭
Promotional Websites	⬭	⬭	⬭	⬭	⬭
Websites of Instittuions	⬭	⬭	⬭	⬭	⬭
Advertisements on Radio/TV	⬭	⬭	⬭	⬭	⬭
Senior friends at previous Instituion	⬭	⬭	⬭	⬭	⬭
Senior friends/ acquaintances at present Instituion	⬭	⬭	⬭	⬭	⬭
Classmates/Peer-group	⬭	⬭	⬭	⬭	⬭

29. My cost of searching information for HE included
Please feel free to mark more than one option and add
Check all that apply.

☐ Price (fees) of the sources (brochures etc)

☐ Travel cost to access the sources

☐ Cost of Acquainting people (approaching, knowing)

☐ Cost of Internet access

☐ Other: _____

30. I felt missing out on other activities while I spent my time searching for information for HE and HEIs.
This trade-off between one action and its alternative OR missing out on one thing while doing other, is called opportunity cost
Mark only one oval.

	1	2	3	4	5	
Very Often	⬭	⬭	⬭	⬭	⬭	Very rare

31. My opportunity cost while I spent my time searching for information for HE has been
Opportunity Cost due to missing out on other activities while pursuing one, as explained above
Mark only one oval.

	1	2	3	4	5	
Very High	⬭	⬭	⬭	⬭	⬭	Very Low

32. My cost of searching information (before admission) through the following sources has been
Please rate the items of cost you incurred
Mark only one oval per row.

	Very High	High	Average	Low	Very Low
Brochures of HEIs	⬭	⬭	⬭	⬭	⬭
Prospectus of HEIs	⬭	⬭	⬭	⬭	⬭
Newspapers/Magazines	⬭	⬭	⬭	⬭	⬭
Knowing people who have information	⬭	⬭	⬭	⬭	⬭
Searching through Internet	⬭	⬭	⬭	⬭	⬭
Visiting my present Institute	⬭	⬭	⬭	⬭	⬭

33. My top three choices (HEIs) for admission can be ranked according to their distance from my place of stay before admission as
Mark only one oval per row.

	Very Far	Far	The same institution (previous)	Near	Very Near
1st choice	⬭	⬭	⬭	⬭	⬭
2nd choice	⬭	⬭	⬭	⬭	⬭
3rd choice	⬭	⬭	⬭	⬭	⬭

34. I evaluated these alternatives (HEIs for admission) on the basis of
Please feel free to mark more than one option and add
Check all that apply.

☐ the reputation of HEIs

☐ my affordability (cost of education including boarding and lodging)

☐ my merit (to qualify)

☐ employability (job-prospects)

☐ parents will

☐ discussion with friends

☐ discussion with Teachers at previous Instituion

☐ discussion with relatives

☐ distance from my parents place/home

☐ ampus environment

☐ Other: _____

35. Recalling my pre-admission days I find that
Mark only one oval per row.

	YES	NO
Present Institution is one of my top three choices	⬭	⬭
Present course has been my first choice	⬭	⬭
Present Subject(s) has/have been my first choice	⬭	⬭
I visited my present Institute to collect information	⬭	⬭

36. I searched for information regarding HEIs (on most of the occasions)
Check all that apply.

☐ Alone

☐ With help of someone (friend/relative)

☐ in a group

☐ Other: _____

37. I evaluate the reputation of a HEI on the basis of
Please feel free to add and mark more than one option
Check all that apply.

☐ its oldness

☐ local popularity

☐ respected by educated people known to me

☐ heard for long time

☐ ranking by independent organisations

☐ alumni

☐ teaching quality

☐ teachers publications

☐ International collaborations

☐ Other: _____

38. I think Information is easily accessible when
Mark only one oval per row.

	YES	NO
Time spent is lesser	◯	◯
It is easily understandable	◯	◯
It is authentic	◯	◯
It is available readily	◯	◯
Cost incurred is lesser	◯	◯
Source is nearby	◯	◯

39. I visited websites to seek information before admission *
Mark only one oval.

◯ Yes   *Skip to question 51.*

◯ No   *Skip to question 40.*

Conventional Information Seekers
(To be answered by those who have NOT visited websites to seek information before admission)

40. I feel that visiting websites of HEIs would have facilitated my choice and decision-making
Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

41. **I judge relevenace of information on the basis of**
    Please feel free to add and mark more than one option
    Check all that apply.

    ☐ contents

    ☐ topicality/matching the requirements

    ☐ completeness

    ☐ legitimacy of the source

    ☐ Other: _____

42. **I used to search information for admission purpose by**
    Please feel free to add and mark more than one option
    Check all that apply.

    ☐ searching for a particular institution

    ☐ looking for institution in certain location

    ☐ institution of certain category

    ☐ institution with certain feature

    ☐ searching for course and subject

    ☐ Other: _____

43. **I experienced difficulties in seeking information for admission to HEIs due to**
    Please feel free to add and mark more than one option
    Check all that apply.

    ☐ time taken

    ☐ tiring/ boring process

    ☐ difficulties in understanding

    ☐ my limited affordability (buying capacity)

    ☐ distance

    ☐ Overload of information

    ☐ Other: _____

44. **I feel the time I spent for information seeking was**
    Mark only one oval.

	1	2	3	4	5	
Much more than required	○	○	○	○	○	Much less than required

45. **I feel that I could extract the information I needed from my sources**
    Mark only one oval.

	1	2	3	4	5	
Always	○	○	○	○	○	Never

46. **I got tired/bored from information seeking from my sources**
Mark only one oval.

	1	2	3	4	5	
Always	◯	◯	◯	◯	◯	Never

47. **I can understand the information conveyed to me by my sources**
Mark only one oval.

	1	2	3	4	5	
Very Easily	◯	◯	◯	◯	◯	With much difficulty

48. **I feel that the proximity to institutions aids in information seeking**
Mark only one oval.

	1	2	3	4	5	
Always	◯	◯	◯	◯	◯	Never

49. **I found travelling to long distances discouraging for information seeking**
Mark only one oval.

	1	2	3	4	5	
Always	◯	◯	◯	◯	◯	Never

50. **I think that different people understand same piece of information diferently** *
Mark only one oval.

◯ Yes   *Skip to question 67.*

◯ No   *Skip to question 67.*

Electronic Information Seekers
(To be answered by those who HAVE visited websites before admission)

51. **On homepages of websites of HEIs, I feel attracted to**
Mark only one oval per row.

	Very Often	Often	Sometimes	Rarely	Very Rare
Flash Messages	◯	◯	◯	◯	◯
Rotating Pictures	◯	◯	◯	◯	◯
Revolving Pictures	◯	◯	◯	◯	◯
Rotating TEXTs	◯	◯	◯	◯	◯
Revolving TEXTs	◯	◯	◯	◯	◯
Static(not moving) Graphics	◯	◯	◯	◯	◯
A to Z link	◯	◯	◯	◯	◯
Website Search Options	◯	◯	◯	◯	◯
Link for Students	◯	◯	◯	◯	◯

52. **I find these links on homepages of websites of HEIs, to be**
Please choose appropriate response from matching the row with column
Mark only one oval per row.

	Very Useful	Useful	Cant say	Somewhat Useful	Not Useful
Flash Messages	◯	◯	◯	◯	◯
Rotating Pictures	◯	◯	◯	◯	◯
Revolving Pictures	◯	◯	◯	◯	◯
Rotating TEXTs	◯	◯	◯	◯	◯
Revolving TEXTs	◯	◯	◯	◯	◯
Static(not moving) Graphics	◯	◯	◯	◯	◯
A to Z link	◯	◯	◯	◯	◯
Website Search Options	◯	◯	◯	◯	◯
Link for Students	◯	◯	◯	◯	◯

53. **I judge the relevance of the information on the home page from**
Please feel free to add and mark more than one option
Check all that apply.

☐ reading first few lines

☐ reading everything/whole

☐ searching for keywords

☐ Other: _____

54. **The general impression of websites of HEIs on me is that they**
Please feel free to add and mark more than one option
Check all that apply.

☐ tend to appreciate themselves

☐ are user-friendly

☐ are funny

☐ irrelevenat

☐ overloaded with information

☐ Other: _____

55. **My experience of web-searching says**
Mark only one oval per row.

	Very Often	Often	Sometimes	Rarely	Very Rare
HEIs tend to prioritise information	◯	◯	◯	◯	◯
Broken links are encountered	◯	◯	◯	◯	◯
Searching information through Websites is costlier than other sources	◯	◯	◯	◯	◯
Searching information through Websites is easier than other sources	◯	◯	◯	◯	◯

56. I judge a website from
Please feel free to add and mark more than one option
Check all that apply.

- [ ] font, colour, animation
- [ ] mix of colours, background colour
- [ ] informative contents
- [ ] multimedia character
- [ ] topicality of links (headings matching contents)
- [ ] preferred links on homepage
- [ ] appearance of the webpage
- [ ] relative to other websites
- [ ] Other: _____

57. I consider web-linkages as
Mark only one oval per row.

	Helping in Navigation	Sign of credibility for the website	Sign of relevant information	Nothing more than usual
Internal (links among contents of different webpages of a website)	⬭	⬭	⬭	⬭
External (Links between different websites)	⬭	⬭	⬭	⬭

58. I used to search information for admission purpose by
Please feel free to add and mark more than one option
Check all that apply.

- [ ] typing the name of the instituion
- [ ] looking for institutions in certain location
- [ ] institutions of certain category
- [ ] institutions with certain feature
- [ ] searching for course and subject
- [ ] Other: _____

59. To me the ease of access to information from Internet is
Please feel free to add and mark more than one option
Check all that apply.

- [ ] availability on home page
- [ ] Link availability on home page
- [ ] Lesser number of clicks of the mouse
- [ ] Other: _____

60. **I started visiting websites of HEIs to seek information from**
Please feel free to add and mark more than one option
Mark only one oval.

( ) School days

( ) On joining the previous course

( ) During the last year of previous course

( ) During the year break/gap

( ) While employed (temporary/permanent)

( ) Other: _____

61. **I think the time I spent for information seeking through Internet was**
Mark only one oval.

	1	2	3	4	5	
Much more than required	( )	( )	( )	( )	( )	Much less than required

62. **I experienced difficulties in seeking information through Internet/ websites due to**
Please feel free to add and mark more than one option
Check all that apply.

[ ] time taken

[ ] tiring/boring process

[ ] difficulties in comprehending websites

[ ] my limited affordability

[ ] distance of internet access places

[ ] Overload of information on websites

[ ] Other: _____

63. **I feel that proximity to Internet helps in information seeking**
Mark only one oval.

	1	2	3	4	5	
Always	( )	( )	( )	( )	( )	Never

64. **I feel tiredness/boredom from visiting websites**
Mark only one oval.

	1	2	3	4	5	
Always	( )	( )	( )	( )	( )	Never

65. **I feel that travelling long distances to access Internet discourages surfing Internet**
Mark only one oval.

	1	2	3	4	5	
Always	( )	( )	( )	( )	( )	Never

66. **I think that different people understand same website differently**
Mark only one oval.

⬭ Yes   *Skip to question 67.*

⬭ No   *Skip to question 67.*

Day to Day Information search
To be answered by all respondents

67. **I find the website of my present institution**
Mark only one oval.

	1	2	3	4	5	
Very Useful	⬭	⬭	⬭	⬭	⬭	Very useless

68. **I use the website of my present institution for**
Please feel free to add and mark more than one option
Check all that apply.

☐ updates regarding classes

☐ previous exam question papers

☐ lecture notes

☐ virtual notice board

☐ syllabus/course-details

☐ Other: _____

69. **My place of residence is/ has been**
Please mark only one oval per row
Mark only one oval per row.

	Home (with parents)	Relative's Place	Hostel	Rented Accommodation (independent)
Nowadays	⬭	⬭	⬭	⬭
Before this course	⬭	⬭	⬭	⬭

70. **My frequency of using internet/www has been**
Please mark only one oval per row
Mark only one oval per row.

	Rare	Once a Week	More than once a Week	Less than once a Month	Once a Month	More than once a Month	Everyday
Nowadays	⬭	⬭	⬭	⬭	⬭	⬭	⬭
Before this course	⬭	⬭	⬭	⬭	⬭	⬭	⬭

71. **I think experience provides better information than search with respect to HEIs.**
Mark only one oval.

	1	2	3	4	5	
Always	⬭	⬭	⬭	⬭	⬭	Never

Perceptions and Experiences

Our experiences help us to verify our expectations and in changing our perceptions. Please rate your change of perceptions based on your experiences at your present institution of Higher Education (HEI).

72. **Having joined my present institution, I realised that Fee-structure differs from what I knew before admission.**

    Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

73. **I have felt that HOSTEL FACILITY differs from what I knew before admission.**

    Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

74. **I feel that TOTAL COST OF EDUCATION differs(more/less) from what I knew/was told before admission.**

    Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

75. **Having joined my present institution, I came to know that TEACHERS ARE NOT THAT GOOD what I knew/expected before admission.**

    Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

76. **I feel that CAMPUS ENVIRONMENT differs from what I knew before admission.**

    Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

77. **Having joined my present institution, I came to know that PLACEMENT HISTORY OF MY INSTITUTE differs from what I knew/gathered before admission.**

    Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

78. **Having joined my present institution, I came to know that CLUBS/FORUMS AT MY INSTITUTE are not that useful what I gathered before admission.**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

79. **I feel that INTERNATIONAL COLLABORATIONS of MY INSTITUTE are not as good as I knew before admission**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

80. **I feel that MY INSTITUTE IS NOT THAT REPUTED as I knew before admission**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

81. **I feel that FACULTY at MY INSTITUTE are not very active with their PUBLICATIONS (writing)/ IPRs/PATENTS as I knew. before admission**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

82. **Having joined my present institution, I felt that MANDATORY DISCLOSURES by MY INSTITUTE are not as accurate as they should be.**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

83. **Having joined my present course, I came to know that ADMISSION PROCESS at MY INSTITUTE differs from what I knew.**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

84. **Having joined my present course, I came to know that RANGE/LIST of COURSES at MY INSTITUTE differs from what I knew.**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

85. **Having joined my present course, I came to know that SYLLABUS/CURRICULUM differs from what I knew before admission.**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

86. **I feel that JOB-PROSPECTS of MY COURSE differs from what I knew before admission.**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

87. **I feel that Information on ALUMNI differ from what I knew/expected before admission.**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

88. **I feel that PHYSICAL INFRASTRUCTURE differs from what I knew before admission.**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

89. **Having joined, I came to know that the DAY to DAY Management of THE INSTITUTE differs from what I knew before admission.**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

90. **I feel that the PEER GROUP of THE INSTITUTE is different from what I knew/expected before admission.**

Mark only one oval.

	1	2	3	4	5	
Very Much	◯	◯	◯	◯	◯	Not at All

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Appendix-V

Figure-5A.1: Homepage of a representative Central HEI

Source: www.nitw.ac.in retrieved on 30.05.2014

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Figure-5A.2 : Homepage of a representative Private HEI

Source: www.adtu.in retrieved on 03.06.2014

Table-5.20.1: Logistic regression with lrnkqul-initial iterations

VARIABLES	(1) Odds ratio	(2) Odds ratio	(3) Odds ratio	(4) Odds ratio	(5) Odds ratio
2.Region	-1.024**	-1.029**	-1.029**	-1.042**	-1.038**
	(0.492)	(0.497)	(0.497)	(0.494)	(0.495)
3.Region	-1.077**	-1.078**	-1.089**	-1.115**	-1.115**
	(0.541)	(0.541)	(0.542)	(0.533)	(0.532)
4.Region	-2.088***	-2.085***	-2.107***	-2.141***	-2.155***
	(0.644)	(0.643)	(0.645)	(0.630)	(0.626)
1.DeemedUni	2.228***	2.228***	2.221***	2.235***	2.211***
	(0.587)	(0.588)	(0.586)	(0.587)	(0.575)

274

in_abthei	0.178	0.179	0.210**	0.214**	0.213*
	(0.130)	(0.130)	(0.106)	(0.106)	(0.110)
in_nriintstds	0.241***	0.240***	0.234***	0.232***	0.233***
	(0.0658)	(0.0652)	(0.0650)	(0.0639)	(0.0653)
1.cvfac	1.155**	1.150**	1.111**	1.105**	1.081**
	(0.459)	(0.457)	(0.437)	(0.435)	(0.434)
in_plcmntemp	0.131**	0.131**	0.139**	0.140**	0.143**
	(0.0631)	(0.0630)	(0.0579)	(0.0576)	(0.0583)
in_eocell	-0.543*	-0.539**	-0.535**	-0.526**	-0.541**
	(0.278)	(0.275)	(0.270)	(0.267)	(0.264)
in_telphdirct	0.117**	0.118**	0.119**	0.122**	0.122**
	(0.0524)	(0.0512)	(0.0508)	(0.0496)	(0.0496)
in_authrwebst	-0.134***	-0.137***	-0.134***	-0.130***	-0.123***
	(0.0430)	(0.0409)	(0.0406)	(0.0394)	(0.0377)
in_comnt	-0.190	-0.193*	-0.171	-0.170	-0.175
	(0.118)	(0.111)	(0.122)	(0.117)	(0.114)
1.heiaffcol	0.880*	0.877*	0.875*	0.863*	0.858*
	(0.462)	(0.460)	(0.455)	(0.449)	(0.448)
1.CS_SKC	-1.122**	-1.105**	-1.062**	-1.059**	-1.078**
	(0.519)	(0.498)	(0.496)	(0.495)	(0.498)
in_wbcurtupdt	-0.00784				
	(0.0425)				
in_whatsnew	0.0233	0.0227	0.0237		
	(0.0583)	(0.0576)	(0.0577)		
in_smrss	0.0287	0.0286			
	(0.0515)	(0.0514)			
in_mouintclb	0.0276	0.0259	0.0287	0.0278	

	(0.0433)	(0.0403)	(0.0403)	(0.0399)	
2.MoF	0.781	0.779	0.800	0.810	0.802
	(0.599)	(0.597)	(0.594)	(0.592)	(0.584)
3.MoF	0.733	0.737	0.836*	0.856*	0.841*
	(0.478)	(0.476)	(0.491)	(0.494)	(0.491)
in_alum	0.103*	0.104*	0.101*	0.102*	0.105*
	(0.0620)	(0.0620)	(0.0601)	(0.0599)	(0.0603)
Constant	-1.397*	-1.398*	-1.459*	-1.469*	-1.430*
	(0.837)	(0.836)	(0.846)	(0.850)	(0.841)
Observations	223	223	223	223	223

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table-5.20.3: linktest

Iteration 0: log likelihood = -143.71972

Iteration 1: log likelihood = -103.76217

Iteration 2: log likelihood = -101.73446

Iteration 3: log likelihood = -101.47272

Iteration 4: log likelihood = -101.47161

Iteration 5: log likelihood = -101.47161

Logistic regression   Number of obs =   223

                               LR chi2(2)   =   84.50

                               Prob > chi2 =   0.0000

Log likelihood = -101.47161   Pseudo R2   =   0.2940

```
-------------------------------------------------------------------------------

  lrnkqul |    Coef.   Std. Err.     z    P>|z|    [95% Conf. Interval]

-------------+-----------------------------------------------------------------

     _hat |  .9521857  .1472673   6.47  0.000    .663547   1.240824

   _hatsq | -.0734245  .0739534  -0.99  0.321   -.2183705   .0715216

    _cons |  .0945609  .2091826   0.45  0.651   -.3154295   .5045513

-------------------------------------------------------------------------------
```

Here, the linear predicted value (_hat) is significant and the linear predicted value squared (_hatsq) is not significant. The significant _hat indicates that the model is properly specified while the not significant _hatsq indicates that no additional variable needs to be included in the model as there is no predictive power left except by chance.

Table-5.20.4: Logistic Model (iteration) for Private HEIs

	(1)
VARIABLES	Odds ratio
1.EastIn	-2.701**
	(1.331)
1.DeemedUni	1.721**
	(0.726)
in_abthei	0.913***
	(0.306)
in_nriintstds	0.391
	(0.282)
1.cvfac	0.195
	(0.631)
in_plcmntemp	0.216**
	(0.100)
o.in_eocell	-

in_authrwebst	-0.0864
	(0.0618)
1.heiaffcol	0.474
	(0.815)
1.CS_SKC	-0.362
	(0.917)
Constant	-2.496*
	(1.295)
Observations	75

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table-5T.5: Logistic Model (iteration) for Government Funded (Central and State) HEIs

Logistic regression   Number of obs   =   142

                                       Wald chi2(10)   =   44.80

                                        Prob > chi2   =   0.0000

Log pseudolikelihood = -55.791893   Pseudo R2   =   0.3593


```
--------------------------------------------------------------------------------

           |                   Robust

   lrnkqul |    Odds Ratio  Std. Err.    z   P>|z|    [95% Conf. Interval]

-------------+----------------------------------------------------------------

   1.EastIn |    .2421402  .1554116   -2.21  0.027    .0688247    .851901

 1.DeemedUni |  48.66225   44.4016    4.26  0.000    8.138007   290.9822
```

```
      in_abthei |    1.093792  .1336734   0.73  0.463   .8608127  1.389828
   in_nriintstds |    1.233824  .0668266   3.88  0.000   1.109559  1.372007
                 |
           cvfac |
             YES |    5.954594  3.677096   2.89  0.004   1.775072  19.97507
    in_plcmntemp |   1.238003  .0775366   3.41  0.001   1.094991  1.399693
        in_eocell |    .813547  .0744916  -2.25  0.024   .6798971  .9734688
    in_authrwebst |   .9020035   .03228   -2.88  0.004   .8409038  .9675427
      1.heiaffcol |    7.564168  4.351966   3.52  0.000   2.449239  23.36099
                 |
          CS_SKC |
         Offered |    .3376888  .195529   -1.87  0.061   .1085558  1.050462
           _cons |    .0892401  .0810862  -2.66  0.008    .015036  .5296474
--------------------------------------------------------------------------------
```

Table-5T.6: Logistic Model (iteration) for Central and State HEIs

VARIABLES	(Central) Odds ratio	(State) Odds ratio
1.EastIn	-1.658	-1.151
	(1.203)	(0.880)
1.DeemedUni	3.183***	
	(1.208)	
in_abthei	-0.616	0.0479
	(0.750)	(0.188)

in_nriintstds	0.204**	0.269***
	(0.0976)	(0.0830)
1.cvfac	0.0620	2.141***
	(1.307)	(0.774)
in_plcmntemp	0.211*	0.274***
	(0.128)	(0.0912)
o.in_eocell	-	
in_authrwebst	-0.0624	-0.138***
	(0.182)	(0.0433)
1.heiaffcol	1.497	1.711**
	(1.044)	(0.728)
1o.CS_SKC	-	
1o.DeemedUni		-
in_eocell		-0.215**
		(0.0955)
1.CS_SKC		-0.657
		(0.682)
Constant	-1.551	-2.587**
	(1.661)	(1.082)
Observations	40	94

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table-5.21.3: linktest

Iteration 0:   log likelihood = -154.46194

Iteration 1:   log likelihood = -119.46252

Iteration 2:   log likelihood = -119.36237

Iteration 3:   log likelihood = -119.35425

Iteration 4:   log likelihood = -119.35419

Iteration 5:   log likelihood = -119.35419

Logistic regression   Number of obs =   223

                                             LR chi2(2)   =   70.22

                                             Prob > chi2   =   0.0000

Log likelihood = -119.35419   Pseudo R2   =   0.2273

----

 lresearch | Coef. Std. Err.   z   P>|z| [95% Conf. Interval]

-------------+---

     _hat | 1.018447 .1585374   6.42 0.000   .7077196 1.329175

   _hatsq | -.0504513 .0709633 -0.71 0.477 -.1895368   .0886342

    _cons | .0524037 .1743769   0.30 0.764 -.2893687   .394176

In Stata, linktest helps in detecting specification error, if any. Here, the linear predicted value (_hat) is significant and the linear predicted value squared (_hatsq) is not significant. The significant _hat indicates that the model is properly specified while the not significant _hatsq indicates that no additional variable needs to be included in the model as there is no predictive power left except by chance.

Table-5.21.4: Logistic Model with lresearch –initial iterations

VARIABLES	(1) lresearch	(2) lresearch	(3) lresearch	(4) Lresearch	(5) lresearch

2.Region	0.127				
	(0.463)				
3.Region	0.131				
	(0.450)				
4.Region	0.00444				
	(0.508)				
2.MoF	-0.407	-0.387			
	(0.457)	(0.451)			
3.MoF	-0.179	-0.154			
	(0.566)	(0.560)			
age_hei	0.0183*	0.0182**	0.0172**	0.0172**	0.0172**
	(0.00944)	(0.00920)	(0.00850)	(0.00851)	(0.00853)
lhppf	0.0284**	0.0291**	0.0294**	0.0294**	0.0298***
	(0.0117)	(0.0116)	(0.0114)	(0.0115)	(0.0114)
in_alum	0.167***	0.167***	0.170***	0.168***	0.167***
	(0.0500)	(0.0493)	(0.0505)	(0.0517)	(0.0507)
in_sitesrch	0.111**	0.110**	0.110**	0.109**	0.108**
	(0.0452)	(0.0443)	(0.0447)	(0.0455)	(0.0453)
in_persrch	-0.0588	-0.0619	-0.0830	-0.0842	-0.0819
	(0.260)	(0.248)	(0.238)	(0.238)	(0.234)
in_atozlink	-0.0221	-0.0242	-0.0145		
	(0.119)	(0.119)	(0.114)		
in_sitemap	-0.0364	-0.0353	-0.0361	-0.0363	-0.0360
	(0.0263)	(0.0262)	(0.0264)	(0.0264)	(0.0265)
in_facsplz	0.0332**	0.0329**	0.0337**	0.0336**	0.0337**
	(0.0167)	(0.0166)	(0.0154)	(0.0152)	(0.0152)
1.CS_MGT	0.978**	0.997**	1.027***	1.030***	1.043***
	(0.405)	(0.397)	(0.364)	(0.361)	(0.358)
1.CS_SST	-0.332	-0.336	-0.353	-0.351	-0.347
	(0.477)	(0.459)	(0.454)	(0.452)	(0.451)
1.CS_SCT	-0.219	-0.241	-0.253	-0.254	-0.238
	(0.379)	(0.373)	(0.372)	(0.373)	(0.359)
1.CS_SCA	0.109	0.106	0.0890	0.0868	
	(0.363)	(0.357)	(0.354)	(0.355)	
1.CS_LNI	1.714***	1.703***	1.790***	1.788***	1.793***
	(0.463)	(0.462)	(0.457)	(0.454)	(0.454)
1.CS_ENG	-0.243	-0.210	-0.223	-0.226	-0.218
	(0.419)	(0.407)	(0.409)	(0.406)	(0.404)
Constant	-3.009***	-2.972***	-3.236***	-3.233***	-3.213***
	(0.761)	(0.725)	(0.594)	(0.595)	(0.598)
Observations	223	223	223	223	223

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table-5.21.5: Logistic Model with lresearch for different categories of HEIs

VARIABLES	(Government) Odds ratio	(Private) Odds ratio	(Central) Odds ratio	(State) Odds ratio
age_hei	0.0218**	0.0149	0.0823*	0.0152
	(0.0107)	(0.0239)	(0.0436)	(0.0115)
Lhppf	0.0288*	0.0355*	-0.116***	0.0474**
	(0.0169)	(0.0197)	(0.0443)	(0.0194)
in_alum	0.0918	0.317***	0.102	0.108
	(0.0635)	(0.105)	(0.185)	(0.0782)
in_sitesrch	0.154**	0.107	0.580**	0.187**
	(0.0641)	(0.0816)	(0.277)	(0.0755)
in_facsplz	0.0529**	0.0174	0.187***	0.0217
	(0.0224)	(0.0296)	(0.0626)	(0.0253)
in_rti	-0.0905**	-0.304	-0.578***	-0.0363
	(0.0427)	(0.230)	(0.192)	(0.0468)
1.CS_LNI	1.452***	1.461	5.461*	0.963*
	(0.436)	(0.947)	(2.841)	(0.540)
1.CS_MGT	0.723	2.411***	-6.391***	1.256**
	(0.476)	(0.774)	(2.426)	(0.619)
Constant	-3.329***	-3.941***	2.812	-3.829***
	(0.838)	(1.214)	(2.407)	(1.046)
Observations	142	81	47	95

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table-5.22A.A: Logistic Model for admission form submission-initial iterations

VARIABLES	(1) Odds ratio	(2) Odds ratio	(3) Odds ratio	(4) Odds ratio	(5) Odds ratio	(6) Odds ratio
Nbrchrs	0.220***	0.180***			0.185***	0.192***
	(0.0572)	(0.0433)			(0.0492)	(0.0495)
Nprspcts	0.0707					
	(0.0529)					
in_prosstud	-0.309***	-0.363***	-0.241***	-0.271***	-0.316***	-0.313***
	(0.0587)	(0.0603)	(0.0545)	(0.0563)	(0.0579)	(0.0577)
in_crculr	-0.0904*					
	(0.0492)					
in_heiemail	-0.0558***	-0.0282**			-0.0460***	-0.0494***
	(0.0153)	(0.0111)			(0.0129)	(0.0131)
in_cntctdtl	0.0455			0.0329		
	(0.0325)			(0.0328)		
in_authrwebst	-0.0761**	-0.0936***	-0.0465**	-0.0670**	-0.0589***	-0.0572**
	(0.0298)	(0.0251)	(0.0213)	(0.0271)	(0.0221)	(0.0222)
in_rsltexams	-0.0364*			-0.0379*		
	(0.0206)			(0.0207)		
1.AdmAppFees_NB	-0.676		-0.292	-0.270		
	(0.976)		(0.909)	(0.929)		
in_rnkqul	-0.170***	-0.200***	-0.127***	-0.155***	-0.172***	-0.166***
	(0.0542)	(0.0454)	(0.0438)	(0.0436)	(0.0514)	(0.0509)
1.DeemedUni	0.677*	0.191	0.478	0.548	0.785**	0.843**
	(0.364)	(0.340)	(0.350)	(0.359)	(0.348)	(0.351)

	(1)	(2)	(3)	(4)	(5)	(6)
in_nriintstds	0.145***	0.199***	0.130***	0.128***	0.180***	0.178***
	(0.0467)	(0.0444)	(0.0383)	(0.0372)	(0.0446)	(0.0435)
1.AdmAppFees_CC	-2.522**	-3.991***	-3.337***	-3.211***	-3.332***	-3.335***
	(1.015)	(0.757)	(0.989)	(0.995)	(0.560)	(0.549)
1.CS_MGT	-0.860***	-0.476	-0.719**	-0.834***	-0.817***	-0.873***
	(0.311)	(0.319)	(0.299)	(0.299)	(0.302)	(0.301)
2.Region	-0.799	-0.882*	-1.096**	-1.050**	-1.062**	
	(0.487)	(0.459)	(0.430)	(0.452)	(0.446)	
3.Region	-0.356	-0.640	-0.821**	-0.730*	-0.595	
	(0.417)	(0.431)	(0.399)	(0.402)	(0.401)	
4.Region	-0.475	-0.694	-0.568	-0.583	-0.553	
	(0.446)	(0.480)	(0.442)	(0.446)	(0.430)	
1.ADMNAPP_BC_DD		-2.441***				
		(0.414)				
1.Brochures_Downldable			-1.162***	-1.167***		
			(0.321)	(0.324)		
in_alum				0.0995**		
				(0.0413)		
1.WestIn						-0.668**
						(0.334)
Constant cut1	-4.988***	-7.404***	-6.499***	-6.277***	-5.288***	-4.878***
	(0.809)	(1.088)	(0.992)	(0.971)	(0.772)	(0.669)
Constant cut2	-2.724***	-4.623***	-4.321***	-4.039***	-3.082***	-2.699***
	(0.739)	(0.931)	(0.903)	(0.881)	(0.698)	(0.609)
Observations	223	223	223	223	223	223

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table-6A.1: Enrolment in Discipline(s)/Area(s)of Social Sciences and Arts/Humanities				
Discipline/Area	Percentage(s) of Respondents			
	UG	PG	Research	Total
HUMI	0.98	0	0.86	0.67
LNF	1.96	0	0	0.67
LNI	6.86	0	3.45	3.68
ENG	10.78	3.7	2.59	5.69
Humanities-Total	**20.59**	**3.7**	**6.9**	**10.7**
SST	43.14	4.94	15.52	22.07
SSI	3.92	16.05	12.07	10.37
ECO	19.61	25.93	34.48	27.09
SW	2.94	17.28	0	5.69
Social Sciences-Total	**69.61**	**64.2**	**62.07**	**65.22**

Source: Students' Survey

Table-6B.2: Enrolment in Applied Discipline(s)/Area(s), Science and Technology				
Discipline/Area	Percentage(s) of Respondents			
	UG	PG	Research	Total
MGT	0.98	4.94	0.86	2.01
PFA	1.96	1.23	0	1
LIGT	0.98	0	2.59	1.34
LAW	6.86	1.23	0	2.68
COM	0	1.23	0.86	0.67
JMC	4.9	1.23	0.86	2.34
EDU	0	2.47	14.66	6.35

Applied Subjects-Total	15.69	12.35	19.83	16.39
TECH	9.8	2.47	2.59	5.02
ARCH	0.98	0	0.86	0.67
SCI	0.98	7.41	4.31	4.01
SCT	9.8	7.41	4.31	7.02
SCA	4.9	4.94	1.72	3.68
Science and Technology-Total	26.47	22.22	13.79	20.4

Source: Students' Survey

The respondents are mostly enrolled in disciplines and areas of social sciences. The categorisation of disciplines and areas are in line with the one obtained from the survey of websites of HEIs. Among the students enrolled in UG programmes, most of them are pursuing traditional social science courses. After social sciences, area having most of the respondents at UG level is science and technology. The students at PG and Research level are mostly studying Economics. The area having most enrolment at the PG level is science and technology while applied subjects have second most enrolment at the research level.

Table-6.A.3: Cross-tabulation of family Income with Levels of Enrolment

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    Family income | Under Gra  Post Grad  Research |    Total

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      No response |     2        1        0 |      3

   Upto INR 15,000 |     25       18       20 |     63

INR 15,001 to 30,000 |    15       19       31 |     65

INR 30,001 to 50,000 |    18       20       27 |     65

INR 50,001 to 75,000 |    13       13       15 |     41

   Above INR 75,000 |    29       10       23 |     62

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        Total |    102       81      116 |    299
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Table-6.A.4: Independent t-test for cost of accessing information with Gender		
Cost related to	t	Pr(|T| > |t|)
Missing on other activities	-3.73**	0.0002
Opportunity Cost	-3.40**	0.0008
Brochures	-2.54**	0.01
Prospectus	-1.2	0.2
Newspapers/Magazines	-2.04**	0.04
Knowing people	-1.66	0.09
Internet	-1.29	0.19
Visiting present HEI	-1.1	0.2
Source: Students' Survey		

Table-6C.2: Gender wise Awareness of categories of HEI			
Matching Status	Male	Female	Total
Match	80.8	79.5	80.1
Mismatch	19.2	20.5	19.9
Total	100	100	100

Source: Students' Survey

Table-6C.3: Caste-wise Awareness of categories of HEIs		
Caste(s)	Match	Mismatch
General	79.6	20.4
OBC	79.3	20.7
SC	84.2	15.8
ST	82.6	17.4
Non-General	81.0	19.0
Total	80.1	19.9

Source: Students' Survey

Table-6.G.3: Linktest for Logit regression R-D.4

Iteration 0: log likelihood = -135.25294

Iteration 1: log likelihood = -110.72805

Iteration 2: log likelihood = -107.22683

Iteration 3: log likelihood = -107.02833

Iteration 4: log likelihood = -107.02741

Iteration 5: log likelihood = -107.02741

Logistic regression   Number of obs =   292

                                  LR chi2(2)   =   56.45

                                  Prob > chi2   =   0.0000

Log likelihood = -107.02741   Pseudo R2   =   0.2087

Cat_HEIMatch | Coef. Std. Err.   z   P>|z| [95% Conf. Interval]

-------------+---

    _hat | .9512317 .3217901   2.96 0.003   .3205347   1.581929

   _hatsq | -.0189791 .1110533   -0.17 0.864   -.2366396   .1986813

    _cons | -.0072071 .2555284   -0.03 0.977   -.5080336   .4936194

Table-6.H.3: Linktest for Logit regression (R-H.4)

linktest

Iteration 0: log likelihood = -181.41368

Iteration 1: log likelihood = -131.16097

Iteration 2: log likelihood = -131.12966

Iteration 3: log likelihood = -131.12964

Iteration 4: log likelihood = -131.12964

Logistic regression   Number of obs =   262

                                            LR chi2(2)   =   100.57

                                            Prob > chi2   =   0.0000

Log likelihood = -131.12964   Pseudo R2   =   0.2772

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   lreput | Coef. Std. Err.   z   P>|z| [95% Conf. Interval]

-------------+--

    _hat | 1.025135   .1337459   7.66   0.000   .762998   1.287272

   _hatsq | .0623558   .073181   0.85   0.394   -.0810763   .2057878

    _cons | -.0914037   .1878897   -0.49   0.627   -.4596608   .2768534

Table-6A.7: Results of linktest for Regression R.7.6

. linktest

Iteration 0: log likelihood = -167.63333

Iteration 1: log likelihood = -130.17658

Iteration 2: log likelihood = -129.61102

Iteration 3:   log likelihood = -129.60963

Iteration 4:   log likelihood = -129.60963

Logistic regression   Number of obs   =   263

                                             LR chi2(2)   =   76.05

                                             Prob > chi2   =   0.0000

Log likelihood = -129.60963   Pseudo R2   =   0.2268

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  ldlymngnt | Coef.   Std. Err.   z   P>|z| [95% Conf. Interval]

-------------+--

       _hat | 1.092115 .1872147   5.83 0.000   .7251807   1.459049

     _hatsq | .0785321 .0974426   0.81 0.420   -.1124519   .2695162

      _cons | -.0691794 .1928612 -0.36 0.720   -.4471804   .3088217