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Constructing Theoretical Framework for Virtual Reference Service: a Technology Acceptance Approach

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Constructing Theoretical Framework for Virtual Reference Service: a Technology Acceptance Approach

Abstract

The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology. The actual system use is the end-point where people use the technology. Behavioural intention is a factor that leads people to use the technology. Virtual Reference Service (VRS) has been found to be successful and effective in providing remote assistance to the library patrons online. VRS is the extension of the age-old reference service being offered by the libraries worldwide. This extension is brought through technology and techniques augmented and enriched by implementation ICTs including software and hardware. Present paper attempts to understand the theories and models focussed on TAM in context with Virtual Reference Service. The outcome of the study supports the alignment of TAM with VRS significantly. This correlation of TAM and VRS is comprehensive and novel that builds the case for in depth exploration of ICTs adoption to facilitate VRS in libraries and obtaining the perception of library professionals appropriately.

Keywords: Virtual Reference Service, VRS, Theoretical Framework, Technology Acceptance Model (TAM)

1.1 Introduction

Samuel Green, in his 1876 paper titled, "Personal Relations Between Librarians and Reader," wrote, "helping users locate information is essential because the public is not trained to find information" (Bopp & Smith, 2001). Assistance to users in finding required information has become more relevant in the 21st century owing to multiplicity, magnitude and enormity of information forms and formats, especially online information. The assistance of users forms the kernel of reference service the essence of which was beautifully expressed by PadmaShri Dr. S. R. Ranganathan as the process of establishing "contact between the right reader and right book at the right time and in the right personal way" (Ranganathan, 1989). Ranganathan defines Reference Service as: "Personal Service to each reader in helping him to find the documents answering his interest at the moment pinpointedly, exhaustively and expeditiously" (Ranganathan, 1961). He further enunciated that the questions or queries which are answered by the library staff can be categorized as: "Ready reference queries, Short-range queries and Long-range queries". The ready reference queries are the queries

which are answered immediately to satisfy the readers. The short-range queries are the queries which take some time to answer and the long-range queries are the ones which take one or more weeks to be answered.

Reference Service enables libraries to meet the information needs of the users (Chowdhury, 2002). In response to developments in society and library use, reference services began in the late 19th and early 20th centuries as the libraries started witnessing an increase in the volume, variety and format of available information resources. As a result, it became difficult for library users to find the resources they were looking for and find the information they needed within that resource independently, without the assistance of library staff in the shape of reference service. Reference service also referred to as reference and information service involves personal assistance to library users seeking information provided by trained library professionals. Personal, timely and quality assistance to facilitate the users' information needs is the reference librarian's primary role. It is the culmination of all library activities including acquisition, classification, cataloguing and physical planning, aimed at making the library and its resources easier to use. It is one of the most demanding aspects of librarianship and its quality of performance may influence the library's image either positively or negatively (Adebayo, 2009). Reference service is the interpersonal communication process which is designed to provide information to a person who needs it, either directly from an appropriate source, or indirectly by providing the person with the source or teaching him how to find the needed information in the sources (James, 1978).

According to Hutchins, “reference work includes the direct, personal aid within a library to persons in search of information for whatever purpose and also various library activities especially aimed at making the information as easily available as possible” (Hutchins, 1944). ALA Glossary states, “reference service is that phase of library work which is directly concerned with assistance to readers in securing information and in using the resources of the library in study and research” (ALA Glossary of Library and Information Science, 1983).

With new technologies, users' information seeking behaviour (ISB) along with their expectations from the reference service has witnessed a sea change. Users of the current generation now possess a wider range of information needs and inquiries while the sophistication with information searching has also increased tremendously. To meet such information needs and demands, libraries need to expand the scope of reference beyond using the mail, telephone, or fax machine with the help

of the computer and the Internet. Technological innovation played a pivotal role in transforming the in-person desk-based Traditional Reference Service (TRS) to Virtual Reference Service (VRS).

1.2 Impact of Technology on Reference Service:

In the 1960s, libraries began to explore new technologies such as microfilm and microfiche, tapes and sound recordings. The 1970s and 1980s brought about significant changes with the emergence of full-text databases and electronic card catalogues in many academic, public, and special libraries (Grohs, Reed, & Allan, 2003). Earlier the librarians used to communicate amongst themselves via email and, soon, with users as well. In 1984, the “University of Maryland Health Sciences Library” and the “Health Science Library at the University of Washington” together developed a service called “Electronic Access to Reference Service (EARS)”, which provided reference assistance via e-mail (Still & Campbell, 1993). With the passage of time, advancement in ICT with affordable infrastructure, the libraries started transforming from the traditional set up to the digital environment. Digital reference evolved from basic e-mail correspondence to more sophisticated systems that allowed librarians to show search results to users. To investigate the feasibility of chat-based communication between librarians and patrons, the project “See You See a Librarian” was developed in 1996 by Eric Lease Morgan. By the end of the 1990s, several companies started to develop software for reference applications. LSSI (Library Systems & Services) developed the first DRS software at the ALA conference in 2000 (Oder, 2001). In 2002, the Library of Congress (LoC) and OCLC developed the collaborative reference service platform, QuestionPoint (QP) (now LibAnswers). The terms "virtual reference," "digital reference," "e-reference," "Internet information services," "live reference" and "real-time reference" are used interchangeably to describe ICT enabled reference services. Some definitions of Virtual Reference Service VRS are given below:

“Internet-based question-and-answer services that connect users with experts in a variety of subject areas. In addition to answering questions, experts may also provide users with referrals to other online and print sources of information”. (Wasik, 2003)

“Reference service initiated electronically where patrons employ computers or other technology to communicate with public services staff without being physically present. RUSA guidelines” (RUSA, 2010)

VRS/DRS expand reference services from the physical reference desk to a "virtual" reference desk where the patron could be writing from home, work or a variety of other locations. It includes the use of both synchronous (i.e., IM, video conferencing, etc.) and asynchronous mode of communication (i.e.,texting, email, etc.). Here, "synchronous virtual reference" refers to any real-time computer-mediated communication between patron and information professional. Asynchronous virtual reference is all computer-mediated communication that is sent and received at different times. VRS is responsive to the patrons' information need, based on communication channels that include chat, video conferencing, Voice-over-IP (VoIP), co-browsing, e-mail, and instant messaging.

In view of the above, the present study entitled "Envisaging Virtual Reference Service in Libraries of Chandigarh Region Innovation and Knowledge Cluster (CRIKC) Institutions: A Study" has been undertaken by the researcher is an attempt to examine the librarians' perception and users' need regarding VRS.

1.3 Need and Purpose

The main objective of the library is to satisfy the information needs of users and ensure that the user is served within the shortest possible time. This calls for the establishment of reference sections in libraries, making effective use of the library resources, satisfying users' needs, providing effective service, enhancing availability, accessibility and timeliness of information delivery. The availability of an unprecedented amount of information, which has affected the method of organization and retrieval, makes it necessary to employ reference and information specialists to assist users. Seeking information or knowledge about something, wanting to know something about anything and anything about something have brought about the essential provision of reference service in libraries. Earlier, under the reference service, assistance was largely provided upon users request. However, libraries are now expected to provide user-anticipated information services. Such proactive services include current awareness services (CAS), Selective Dissemination of Information (SDI), E-document delivery, etc.

Users expect answers to their research-based queries. While search engines, to some extent, may be able to answer simple fact-based queries, users may find it inadequate in case of research-based queries. VRS has been found to be very effective in solving users' concerns in such cases (Numminen and Vakkari 2009). In this context, reference librarians need to alter old and traditional reference strategies by adopting new tools and techniques to enhance the user's engagement with information sources to enhance the research experience (Cannon, 2005).

The procurement of e-resources has increased noticeably with further aid from consortia initiatives which calls for their optimum utilization by the user community. The technological

intervention is essential for ensuring proper utilization of the library resources through web-based instruction and remote access with effective navigation of library electronic resources (Moyo, 2002). VRS facilitates the reference staff to introduce the link to appropriate information sources matching the user information query directly from the OPAC or database hyperlink depending upon the nature of it (print or online).

Katz (1969) rightly pointed out that “If the users will not come to the library, the library must go to the users”. In order to meet the expectations and demands of such users, librarians should adopt the philosophy of “embedded librarianship” by being available wherever they are (Yang & Dalal, 2015).

1.4 Reference Taxonomies:

Inquiries posed in libraries have been classified in a variety of ways including bibliographical, i.e., inquiries about documents; factual or subject inquiries and directional inquiries, e.g., Where is the catalogue? Another common practice is to analyse inquiries by the time taken to answer them. Jahoda discussed a variety of ways in which reference questions can be classified:

- i. heading the patron toward the answer versus providing the answer
- ii. types of answer
- iii. size of an answer—single versus multiple facts, documents
- iv. recall versus discovery
- v. types of tools used
- vi. types of training required of the person answering (Jahoda, 1977)

Katz (2002) categorized reference questions in the following four types:

i. Directional questions:

These are questions that demand the reference librarian giving users the directions to places or resources within the library. Such questions could be “where is the catalogue?”, “where are the indexes?”, “where is the telephone?”

ii. Ready reference questions:

These are the types that require uncomplicated, straightforward answers. An example is “How long is the River Nile?” Ready reference queries can further be classified as: ‘Who’, ‘What’, ‘Where’, ‘Why’ and ‘When’ questions irrespective of their disciplinary scope.

iii. Specific-search question:

Specific-search questions include cases wherein user may demand a specific document or a list of citations, a book, a report, an internet site, etc, this is different from the ready-reference query which can be answered with brief answers using reference sources available with the library.

iv. Research questions:

A research question or queries are usually being raised by researchers or users engaged in higher studies involving research aspects who seek detailed (in-depth) information pertaining to subject-specific study. Queries or reference questions can only be well answered if appropriate tools for locating information are available. These tools may be referred to as reference or information sources. Basic information and reference sources found in most libraries include (but not limited to) encyclopaedias, handbooks, dictionaries, indexes, biographies, almanacs, guides, bibliographies and in recent times databases and the Internet.

1.5 Theoretical Framework:

Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of critical bounding assumptions. A theoretical framework is the set of related ideas leading to a structure that can hold or support a theory of a research study (Abend, 2013). The theoretical framework of the present study attempts to correlate and capture the relationship between the constructs embedded in the models dealing with online communication. The discussion below correlates VRS with the constructs as encapsulated by several theories and models:

1. Computer-Mediated Environments (CMEs)
2. Technology Acceptance Model (TAM)
 - a) Perceived Usefulness (PU)
 - b) Perceived Ease of Use (PEOU)
 - c) Interactivity
3. The Principle of Least Effort (PLE)
4. Flow theory
5. Task-Technology Fit Model (TTF)
6. Unified Theory of Acceptance and Use of Technology (UTAUT)

- a) PE (Performance Expectancy)
- b) EE (Effort Expectancy)
- c) SI (Social Influence)
- d) FC (Facilitating Conduct)
- e) BI (Behavioural Intention) and actual usage

1.5.1 Computer-Mediated Environments (CMEs)

Computer-Mediated Environments (CMEs) are defined as the distributed computer networks used to access and provide hypermedia content. CMEs enable people to communicate and interact electronically, either at the same time or not (Hoffman & Novak, 1996). Today, web-based information systems can be found in applications touching the masses wherein communication is significantly mediated through the web (Koufaris & Hampton-Sosa, 2004). The pervasive use of the World Wide Web (WWW) has led to the creation and proliferation of the CMEs leading to a strong technological medium and mode of communication amongst people. In a library environment, the task-oriented online communication tools like blogs & instant messaging (IM) are an integral part of the CME allowing patrons to communicate and interact electronically, either synchronously or asynchronously. VRS can be initiated and accomplished essentially in a CME for the maximum benefits of the library users.

1.5.2 Technology Acceptance Model (TAM)

Technology is of little value unless it is accepted and used (Oye, Iahad and Ab-Rahim 2012). Therefore, the understanding of technology acceptance is vital because the most important benefit associated with access to the new technologies is the increase in the supply of the information (Suvarna and Godavari 2012). Many researchers have proposed theories and models of technology acceptance in order to explain and predict user acceptance with technology in order to account for rapid change in both technologies and their environment (Oye, Iahad and Ab-Rahim 2012). Based on the theory of reasoned Action, Davis (1989) Developed the Technology Acceptance Model (TAM) which deals more specifically with the prediction of the acceptability of an information system. TAM was developed to explain and predict users' acceptance of new technology (King & He, 2006). TAM predicts the acceptability of a tool and to identify the modifications which must be brought to the system in order to make it acceptable to users. TAM suggests that the perceived usefulness and perceived ease of use of IT are major determinants of its use and the acceptability of an information system is determined these two factors.

According to Louho, Oittinen (2006), technology acceptance is about how people accept and adopt some technology for use. User acceptance of technology has further been explained as the demonstrable willingness within a user group to employ IT for the tasks it is designed to support. Therefore, acceptance can be viewed as a function of user involvement in technology use which serves as a critical factor in determining the success or failure of any technology (Dillon and Morris 1996).

a) Perceived Usefulness (PU)

Perceived usefulness was defined by Davis (1989) as the degree to which a person believes that using a particular information system would enhance their job performance. It reflects the degree to which a person believes that using a particular information system would be free of effort (Lee, Kim, Rhee, & Trimi, 2006). Perceived usefulness directly affects an individual's behavioural intention to use IT.

Empirical confirmation of the relationship between usefulness and attitude has been provided by a number of studies (Agarwal & Prasad, 1999). A number of studies have indicated that Perceived Usefulness(PU) impacts on the intention to use. The persistence of this relationship has also been demonstrated in the specific context of Internet use: individuals who believed that using this technology could lead to positive outcomes also tend to have a more favourable attitude toward it (Vijayasarathy, 2004). The usefulness of reference service, whether traditional or virtual, is a well-accepted fact strengthening the library services quality.

b) Perceived Ease of Use (PEOU)

Perceived usefulness and perceived ease of use are distinct but related constructs (Davis, 1989). Perceived ease of use refers to the degree to which a person believes that the use of a system will be effortless. Improvements in perceived ease of use may contribute to improved performance. Theoretically, the Internet is easy to use for searching for information with the minimum time and effort, which encourages the perception that the Internet is effective (Shih, 2004). Perceived ease of use has a direct, positive effect on perceived usefulness; it is a major determinant of attitude toward use in TAM. With two systems offering the same features, a user will find more useful the one that he finds easier to use (Dillon and Morris, on 1996) TAM emphasizes the importance of perceived usefulness and perceived ease of use as the key determinants of user acceptance of IT.

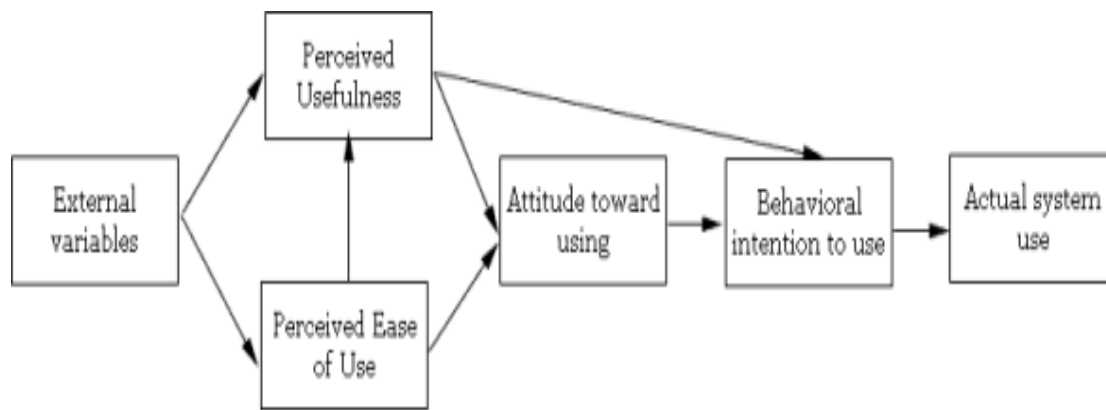


Figure 1.1 Technology Acceptance Model from Davis, Bagozziet Warshaw (1989)

According to Davis (1986) perceived ease of use also influences in a significant way the attitude of an individual through two main mechanisms: self-efficacy and instrumentality. Self-efficacy is a concept developed by Bandura (1982) which explains that the more a system is easy to use, the greater should be the user’s sense of efficacy. Moreover, a tool that is easy to use will make the user feel that he has control over what he is doing (Lepper, 1985). Efficacy is one of the main factors underlying intrinsic motivation (Bandura,1982; Lepper, 1985) and it is what illustrates here the direct link between perceived ease of use and attitude. Perceived ease of use can also contribute in an instrumental way in improving a person’s performance. Due to the fact that the user will have to deploy fewer efforts with a tool that is easy to use, he will be able to spare efforts to accomplish other tasks (Davis, 1986).

VRS (both asynchronous and synchronous) relies on online communication tools familiar to the user community (as well as library professionals) corroborates to Perceived ease of use (PEOU).

c) Interactivity

Interactivity is one of the key characteristics of new media (Hoffman & Novak, 1996). Deighton (1996) interpreted the term “interactive” as the ability of an organization to use IT to contact an individual, gather and remember the response of that individual, and take their unique response into account when interacting with the individual again. Interactivity is a person-to-person or person-to-technology exchange that effects a change in the knowledge or behaviour of at least one person (Haeckel, 1998). It is also defined as the extent to which the communicator and the audience respond to each other’s need for communication. The benefits of adding interactivity to a website include improved user satisfaction and better acceptance (Fortin & Dholakia, 2005).

Interactive features such as search engines and online dialogue facilities reduce the time and effort required for users to find what they want from the Web (Kling, 1994). Individuals assume that an information system that is more attractive will be easier to use (van der Heijden, Verhagen, & Creemers, 2003). Cross and Smith (1996) indicate that increased interactivity may lead to time saving.

Interactivity by itself does not provide the information, but it helps users access it on demand in a relevant and organized way (Teo et al., 2003). Interactivity has been found to deliver available information effectively by engaging the user's attention, increasing his or her involvement, and enriching his or her experience. Chen and Rada's (1996) meta-analysis indicates that users of hypertext systems tend to have higher effectiveness than users of non-hypertext systems. Hypertext is an example of machine interactivity. Person interactivity – the ability to forge a virtual community by interacting with other users through electronic tools such as e-mail or instant messaging-may also help to provide more objective information. Interactivity is an important element of web-based information technology for absorbing users and is not only mediated by task-oriented (external) motivation but also entertainment-oriented (internal) motivation. Interactivity is the core of VRS wherein users can seek answers to their queries from the VRS librarian along with timely information services making their academic pursuit more fruitful.

1.5.3 The Principle of Least Effort (PLE)

The principle was discovered by the French philosopher Guillaume Ferrero, who published it for the first time in an article in the "Revue Philosophique de la France et de l'Étranger" (Ferrero, 1894). This principle states that an information-seeking patron will tend to use the most convenient search method, in the least exacting mode available. Information seeking behaviour stops as soon as minimally acceptable results are found. This theory holds true regardless of the user's proficiency as a searcher or their level of subject expertise. Also, this theory takes into account the user's previous information-seeking experience. The user will use the tools that are most familiar and easy to use that finds results.

Within the context of information seeking, the principle of least effort was studied by Herbert Poole who wrote *Theories of the Middle Range* in 1985. It suggests that regardless of age or role, information seeking behaviour tends to follow the PLE. Poole found the PLE to be the strongest result in a review of a dozen information seeking studies (Poole, 1985). "Least effort" does not mean people

choose the lazy route but rather, information seekers, in general, attempt to minimize the overall work associated with something both now and in the future. Rubin further explains that “people will seek the most convenient source to meet their information need.” Librarian Thomas Mann lists the principle of least effort as one of several principles guiding information seeking behaviour (ISB) in his 1987 book, “A Guide to Library Research Methods”.

Though humans may follow the path of least effort, this path differs among particular types of information seekers, as the depth of information needs may differ according to university status. In a study of health sciences university faculty, students, and residents, De Groote, Hitchcock, and McGowan found that “as users have become more sophisticated information seekers, their demands of librarians have evolved to require more in-depth assistance rather than traditional ready reference questions” (Groote, Hitchcock & McGowan, 2007). Path of Least Resistance (PLR) is analogous to the PLE. VRS provides library professionals with an opportunity to provide more in-depth assistance and relevant information filling the user information gap in accordance with the principle of PLR/PLE.

1.5.4 Flow Theory/ Flow experience

The Flow Theory, which was originally introduced by Csikszentmihalyi and LeFevre (1989), suggests that flow consists of four components: control, attention, curiosity and intrinsic interest. Hoffman and Novak (1996) indicated that key consequences of the flow experience for consumers in hypermedia CMEs are increased learning, exploratory and participatory behaviours, positive subjective experiences, and a perceived sense of control over their interactions. They conceptualized flow on the Internet as a cognitive state experienced during navigation that is determined principally by the characteristics of interactivity (Wu & Chang, 2005). Deci and Ryan (1985) suggested that people expend effort as a result of both intrinsic and extrinsic motivations. Perceived usefulness is an example of extrinsic motivation, whereas flow experience is an example of intrinsic motivation. Webster, Trevino, and Ryan (1993) also noted that flow experience was associated with positive subjective experience and exploratory behaviour.

Webster and Trevino (1995) defined the four characteristics of the core flow experience of interacting with technology viz. feeling in control, focusing attention on the activity, feeling curiosity, and being intrinsically interested. They evaluated the impact of flow on communication-related work outcomes and found that flow can result in positive attitudes and high effectiveness (Liao, 2006). Novak, Hoffman, and Yung (2000) indicated that speed of interaction, one characteristic of interactivity, corresponds to increases in the focus of attention, tele-presence and flow experience.

There exists a positive relationship between flow experience and perceived ease of use. Moon and Kim (2001) considered that IT which is difficult to use is less likely to be found enjoyable, and IT which is easier to use will be less threatening to the user. Additionally, flow experience seems to prolong Internet and website usage (Rettie, 2001). VRS is primarily based on online communication, a well-established phenomenon in the realms of social networking has all the potential and virtues for having a positive impact on user flow experience benefiting the users in the long run.

1.5.5 Task-Technology Fit Model (TTF)

TTF is a model of user acceptance that relates actual use to tool functionality and task characteristics (Dishaw et al., 2002). According to Goodhue and Thompson (1995), Task-technology fit (TTF) theory holds that IT is more likely to have a positive impact on individual performance and be used if the capabilities of the IT match the tasks that the user must perform. They developed a measure of task-technology fit (TTF measure) that consists of 8 factors: quality, locatability, authorization, compatibility, ease of use/training, production timeliness, systems reliability, and relationship with users. The TTF measure articulates that these factors leverage improved job performance and effectiveness.

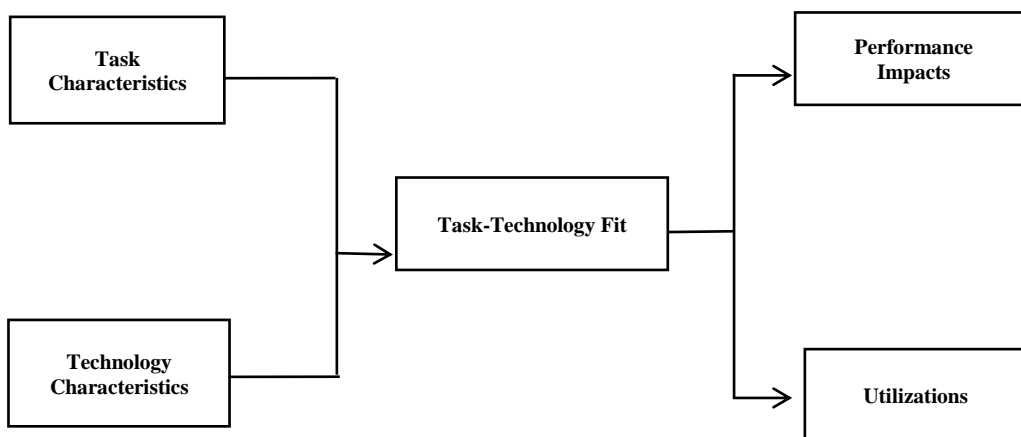


Figure 1.2 Task-Technology Fit Model (TTF)

Source: Goodhue and Thompson, (1995)

TTF has been applied in the context of a diverse range of information systems including the Technology Acceptance Model (TAM). In the context of the present study, VRS can be considered having a positive impact on individual academic performances and capabilities as it encompasses all the eight factors of TTF measure.

1.5.6 Unified Theory of Acceptance and Use of Technology (UTAUT)

The unified theory of acceptance and use of technology (UTAUT) is a Technology Acceptance Model (TAM) formulated by Venkatesh and others in "User acceptance of information technology: Toward a unified view" (Venkatesh et al., 2003). The TAM, which explains user intentions to use information technology and subsequent usage behaviour. According to this model, performance expectancy, effort expectancy, social influence, and facilitating conditions are the four potential constructs to explain user perception and acceptable behaviour. UTAUT is one of the most popular technology acceptance theory which was developed by unifying eight different theories as discussed below:

1.5.6.1 PE (Performance Expectancy)

PE measures the degree to which an individual believes that using the technology will help him/her attain their objectives. PE can have an important role in individual behaviour for accepting or rejecting of VRS. In the context of this study, it is expected that if the users find the system to be useful, then the likelihood of its early adoption and usage will be immense. PE (Performance Expectancy) corresponds to the Perceived Usefulness (PU) discussed earlier above under TAM.

1.5.6.2 EE (Effort Expectancy)

EE is the degree of ease associated with customers' use of technology (Venkatesh et al., 2003). According to UTAUT, EE positively influences Behavioural Intention (BI) to use the technology (Venkatesh et al., 2003). In the context of this study, it is expected that if the users find the VRS easy to use and do not require much effort then they are more likely to use and adopt it. On the contrary, if the users find the VRS to be difficult to use, then they are less likely to adopt it. EE (Effort Expectancy) corresponds to the Perceived ease of use (PEOU) discussed earlier above under TAM.

1.5.6.3 SI (Social Influence)

SI is defined as "a person's perception that most people who are important to him think he should or should not perform the behaviour in question" (Ajzen, 1991). In other words, SI refers to the social pressure coming from the external environment which surrounds the individuals and may affect their perceptions and behaviours of engaging in a certain action such as the opinions of friends, relatives and superiors. Social Influence is one of the most pervasive and powerful mechanisms for behaviour change and persuasion whereby an individual's thoughts and actions can be influenced by those around them. Library users' perception, thoughts, behaviour and action

might get influenced by their academic peers and seniors who are early adopters of online social interaction which is an intrinsic quality of VRS.

1.5.6.4 FC (Facilitating Conduct)

FC has been defined as “the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system” (Venkatesh et al., 2003). In the context of this study, FC will be limited to identifying the current status of the technical infrastructure available with the respective libraries to support the use of VRS for providing required information to the users.

1.5.6.5 BI (Behavioural Intention) and actual usage

Behavioural intention (BI) is defined as a person's perceived likelihood or "subjective probability that he or she will engage in a given behaviour" (Committee on Communication for Behaviour Change in the 21st Century, 2002, p. 31). BI is considered to be an immediate antecedent of usage behaviour and gives an indication about an individuals’ readiness to perform a specific behaviour. Actual behaviour is “the manifest, observable response in a given situation with respect to a given target” (Ajzen, 1991). Behavioural intention (BI) is one of the aspects of the current study wherein user's opinion regarding their likelihood of using the VRS have been sought.

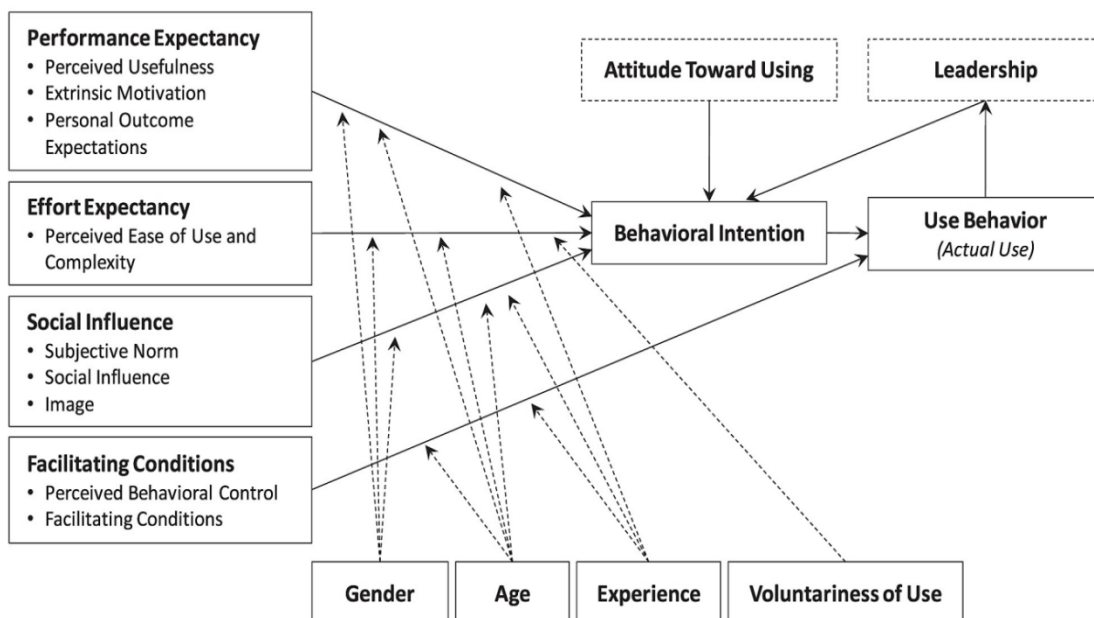


Figure 1.3 Behavioural intention (BI)

Dwivedi, Rana, Jeyaraj, Clement, and Williams (2017) have tabulated the UTAUT constructs as given under:

Table 1.1: Definitions of UTAUT constructs

Construct	Definition
Performance Expectancy (PE)	Performance expectancy is defined as the degree to which an individual believes that using the system will help him or her to attain gains in job performance (Venkatesh et al. 2003).
Effort Expectancy (EE)	Effort expectancy is defined as the degree of ease associated with the use of the system (Venkatesh et al. 2003).
Social Influence (SI)	Social influence is defined as the degree to which an individual perceives that important other believe he or she should use the new system (Venkatesh et al. 2003).
Facilitating Conditions (FC)	Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system (Venkatesh et al. 2003).
Attitude (AT)	An individual's positive or negative feelings about performing the target behaviour (Davis et al. 1989)
Behavioural Intention (BI)	Behavioural intention is defined as a measure of the strength of one's intention to perform a specific behaviour (Fishbein and Ajzen 1975).

Table 1.2: VRS from the lens of Technology Acceptance Models and Theories

SN	Theories/ Models	Constructs/Attributes	VRS Implications/ Determinants
1.	Computer-Mediated Environments (CMEs)	<ul style="list-style-type: none"> ■ Provide access to hypermedia content accompanied by electronic interaction. 	CME is the pre-requisite for VRS which acts as a facilitator and/or mediator for guided online navigation of quality e-resources.
2.	Flow experience	<ul style="list-style-type: none"> ■ A perceived sense of control over quick interactions. ■ Focussed attention. ■ Curiosity intrinsic interest. ■ Exploratory and Participatory behaviours. ■ Positive experiences with positive attitudes and high effectiveness. ■ Increased learning. 	VRS corroborates flow-experience and all its aspects thereof.
3.	Technology Acceptance Model (TAM)		
3.1	Perceived Usefulness (PU)	<ul style="list-style-type: none"> ■ Information System use → increased job performance & positive outcomes 	Establishes positive & higher degrees of PU among users.
3.2	Perceived Ease of Use (PEOU)	<ul style="list-style-type: none"> ■ Improved performance. ■ User's sense of self-efficacy and control. ■ Spare efforts to accomplish other tasks. 	Demonstrates PEOU. VRS users gain better performance and control. Saving staff time with higher productivity.
3.3	Interactivity	<ul style="list-style-type: none"> ■ Change in the knowledge ■ User acceptance ■ Effective retrieval and use of relevant information, ■ Reduce time and effort. ■ On-demand information. ■ Provide more objective information. ■ Engaging the user's attention, involvement, and enriching his or her experience. ■ Improved user satisfaction. 	VRS offers a highly interactive communication medium,
4.	The Principle of Least Effort (PLE)	<ul style="list-style-type: none"> ■ Most convenient search strategy till the retrieval of minimum acceptable results. 	Helps information seekers meet their information need conveniently & accurately

			without compromising with the content quality.
5.	Task-Technology Fit Model (TTF)	<ul style="list-style-type: none"> ■ Positive impact on individual performance ■ quality ■ locatability ■ authorization ■ compatibility ■ ease of use/training ■ production timeliness ■ systems reliability ■ relationship with users 	VRS acquaints users with library resources and addresses their issues with qualitative, location independent, authentic and timely support via a compatible, easy to use, reliable online system while nurturing a trusted, long-term bond with them.
6.	Unified Theory of Acceptance and Use of Technology (UTAUT)		
6.1	PE (Performance Expectancy)	<ul style="list-style-type: none"> ■ Attain objectives positively. 	Influences early adoption of library resources thereby improving academic performance
6.2	EE (Effort Expectancy)	<ul style="list-style-type: none"> ■ Degree of ease associated with users' use of technology 	VRS lowers EE for users seeking online assistance and information.
6.3	SI (Social Influence)	<ul style="list-style-type: none"> ■ Affect user perceptions and behaviours 	A pervasive and powerful mechanism for engaging users with quality library resources.
6.4	FC (Facilitating Conduct)	<ul style="list-style-type: none"> ■ Organizational and technical infrastructure exists to support the use of the system. 	Ensures optimum utilization of organizational and technical infrastructure including PCs, Labs, Internet, etc.
6.5	BI (Behavioural Intention)	<ul style="list-style-type: none"> ■ Individual's intention to perform a behaviour 	Converts intention into actual usage as users start accessing and reading library resources regularly.

VRS enhances the supply of information accompanied by rich information experience ensuring rising technology acceptance by the users. It can be observed that the principles/factors/determinants of VRS acceptance, adoption and usage adhere to the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT). VRS-TAM and VRS-UTAUT influence/influenced by each other.

Users' beliefs about interactivity, perceived ease of use, perceived usefulness, and flow experience are salient for online communication. The three prime intrinsic motivational factors that may influence the intent and acceptance to use of information technology (IT) including online communication tools are perceived ease of use, perceived usefulness and interactivity. Task-

Technology Fit Model (TTF) factors, flow experience, interactivity, perceived ease of use, perceived usefulness, behavioural intention to use online communication tools positively influence each other. They can be viewed as the determinants of acceptance of Virtual reference Service (VRS) leading to enhanced library value, optimum use of e-resources, greater patron engagement and long-term loyalty.

The principle of least effort (PLE) is exceptionally important when considering the design for libraries and research in the context of the modern library. Libraries must take into consideration the user's desire to find relevant information quickly and easily.

Conclusion:

Library users demand and appreciate online services and remote assistance more than ever. Access to information (print or online) has become their priority and removal of hindrance and getting timely online help has emerged as their right. Examining the reasons of non-adoption of virtual reference service (VRS) requires thorough study of technological dimensions of this service. The models and theories including Computer-Mediated Environments (CMEs); Technology Acceptance Model (TAM) (Perceived Usefulness, Perceived Ease of Use, Interactivity); The Principle of Least Effort (PLE); Flow theory; Task-Technology Fit Model (TTF) and Unified Theory of Acceptance and Use of Technology (UTAUT) were found to significantly related to and act as the predictors or indicators of virtual reference service (VRS). Libraries looking forward to implement VRS for their patron may explore these determinants and factors in preparing their VRS policy and reach out to their patrons for seeking their feedback (pre and post) as a feasibility study and pilot survey. These models will help the libraries in understanding the pillars and roadblocks of VRS and assist them in successful implementation of VRS at their academic institution.

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