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# Understanding the Acceptance and Users Perceptions Using Library Digital Reference Service

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**ABSTRACT**

This study is quantitative in nature. The present study addresses the determinants factors of digital reference service acceptance and user perception on digital reference service. Data was collected from 892 postgraduate students of five Research University libraries in Malaysia. SEM was used to test the relationship between the performance expectancy, effort expectancy, service quality, information quality, perceived enjoyment, technical support, information technology (IT) infrastructure support, subjective norms and task compatibility with digital reference service acceptance. In order to analyze quantitative data gathered from the questionnaires, SPSS was used. The descriptive statistics for the nine factors are presented.

**KEYWORDS:** Digital Reference Service, Effort Expectancy, Information Quality, IT Supports, Perceived Enjoyment, Performance Expectancy, Task Compatibility, Technical Support, Technology Acceptance, Service Quality, Subjective Norms.

## INTRODUCTION

Many libraries are now moving toward digitalization. In particular users will expect high support throughout their learning and research activities. Therefore, the digital reference service (DRS) is used to enhance library traditional reference service interactions. DRS is one of the important library services that allow referral services to be performed in real-time efficiently and conveniently for instance by using library e-mail service, Facebook, Instagram, Twitter and etc.

In current times, it is unthinkable if library can even attempt to survive without the use of technology. Supported by [40], in modern days academic libraries cannot continue operating without using ICT in their service delivery. Thus, it has become increasingly clear that most academic libraries are cognizant of the importance of Internet and ICT as a robust tool for the delivery of library service including DRS. Hence, understanding the factors that affect the acceptance of technologies therefore becomes critical for library to survive and prosper.

### The Current State of DRS Use

According to [40] at present, many libraries are offering both asynchronous and synchronous transactions of DRS. E-mail is the earliest [1, 11-12, 26, 32, 45] and most commonly DRS tool used in libraries [11-12, 32, 34-36] including in selected Malaysia academic libraries [57]. For instance, a survey of the academic libraries websites of selected countries of the Asia and Pacific region by [1] found that e-mail is the most commonly used referencing service in Malaysian university libraries. Recently, in another study, the most frequently used Web 2.0 tools by the librarians in university libraries are Facebook, Instant Massager (IM), blogs, Twitter and wikis for announcing library news/events, online reference services, training resources, blogging and image and video sharing [7]. In [59] found that mostly the academic libraries in the study using social networking to interact with user for sharing library news and announcements, creating awareness and promoting new library materials and services and directing users to online library resources. Thus, this shows that library uses multiple DRS medium to interact with user. However, the implementation of DRS in one library may be similar to, but also be different from that of another library.

In [9] found from 100 of the leading academic library websites in the United States revealed that the most popular Web 2.0 applications are Facebook and Twitter, which are used in all their academic libraries. In [31] discovered that Facebook was used by 98.5%, Twitter by 80.6% and Google+ by 79.1% of the student population in New Delhi. The majority of the students responded that they used these applications for both personal and academic purposes, and they were of the view that librarians should communicate with them properly via social networks in order to help them with their academic assignments or to enhance the quality of library services.

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As reported by [16] in an academic library, Facebook pages provide a marketing tool for the services available besides enabling users to ask librarians questions in real time, regardless of where they are. Besides Facebook, Twitter is also used in libraries for a variety of purposes. In [49] found that 44% used their Twitter account to broadcast library news/ information. In [39] found universities libraries using Twitter to announce workshops on library resources, provide links to online archives and give tips on sending text messages to a librarian. In addition, in [37] reported that the academic libraries also used blogs for publishing library news, marketing library services, sharing information about new acquisitions, providing information literacy tutorials, offering online reference services and soliciting feedback and suggestions. Meanwhile, according to [10], blog is used by the libraries for announcing library hours, issuing book reviews, informing the public of instruction sessions and sharing links. In another study, it was found that an academic library posted videos of library tours as well as bibliographic instruction videos for students using YouTube [30]. Without a doubt, numerous university libraries in developing countries today are greatly concerned about DRS use and they depend on DRS to improve their library service.

**Determinants of DRS Acceptance**

Various theoretical models have been devised to investigate the factor impacting the technology acceptance. Based on that, previous literature on the same factors might have the same influence on the acceptance of DRS. Undeniably there are other potentials and possible factors that could be included into the model, but in this study the researcher is more interested in investigating the specific factors that had been grouped into four categories including technological factors, organizational factors, social factors and task factors. The independent variables (1) performance expectancy; (2) effort expectancy; (3) information quality; (4) service quality; (5) perceived enjoyment; (6) technical support; (7) infrastructural support; (8) subjective norm and (9) task compatibility are constructs that have been identified from the literature based on an extensive review of previous studies in the area of technology acceptance and which were considered as possible determinants of DRS acceptance in Malaysia RU Libraries.

Performance expectancy and effort expectancy derived from UTAUT model developed by [56] and were recognised by [47] as technology factors variables. Meanwhile, information quality and service quality derived from IS Success model developed by [13] were also identified as technological factors by [4, 21]. In addition, perceived enjoyment was recognized by [22] as the technology factor. Two constructs of from organizational factors encompassing technical support and IT infrastructure support derived from research model on information technology usage by [8]. Besides that, the technical support was also recognized by [4, 8, 29, 33]as the organizational factor at the research under study. Subjective norms were identified by [19, 42, 44] as social factors. Other than that, task compatibility was suggested as task characteristics by [43]. On the basis of several previous studies [23-25] as two constructs were used for measure the acceptance of DRS including DRS frequency of use and the tasks types (DRS types of questions) for which the user uses the system.

## METHODOLOGY

A survey was developed based on the instrument from previous studies [2-3, 5, 8, 14-15, 27-28, 38, 46, 48, 50-58, 60]. All the constructs have been operationalized using the 7-point Likert scales, ranging from 1 (strongly disagree), 2 (disagree), 3 (slightly disagree), 4 (neutral), 5 (slightly agree), 6 (agree) and 7 (strongly agree). Meanwhile, the respondents were asked to rate each statement of DRS acceptance (DRS frequency use and DRS questions type) using a six-point Likert type scale ranging from 1 “Never” to 6 “More than once a month”.

Data was collected from October 2015 through February 2016. The research subjects were postgraduate students at five Research University libraries in Malaysia who had experience in using DRS. 892 postgraduate students from five Research University libraries participated in the survey. Table 1 provides a summary of the participants’ age level of studies undertaken, mode of study, and where they were currently living. Approximately, 58.6% participants were female whereas remaining were male. Around 60.1% respondents belonged to the age group (25-29 years) which reflects the inclination of younger people toward DRS tools. The majority of the respondents (69.8%) hold a Master’s degree whereas remaining hold PHD students. In addition, 82.2% fulltime students and around 54.8% respondents currently living off campuses took part in this study.

A reliability analysis was conducted for the scales using Cronbach’s alpha. As summarized in Table 2, most of the measures demonstrated adequate reliability with Cronbach’s alpha coefficients ranging from 0.75 to 0.94. Descriptive analysis for the entire sample was performed using SPSS 21.0. Next, SPSS was used to screen the collected data prior to performing structural equation modelling. To test the hypotheses, SEM using AMOS was conducted to explain the influence of performance expectancy, effort expectancy, perceived enjoyment, service quality, information quality, technical support, IT infrastructure support, subjective norms and task compatibility on DRS acceptance [41].

**Table 1: Profile of respondents**

| Demographic Characteristics | Frequency | Valid Percentage |
|---|---|---|
| **Gender** | 369 | 41.4 |
| Male | 523 | 58.6 |
| Female | | |
| Age | | |
| Below 24 years old | 40 | 4.5 |
| 25-29 years old | 536 | 60.1 |
| 30-34 years old | 169 | 18.9 |
| 35-39 years old | 85 | 9.5 |
| 40-44 years old | 29 | 3.3 |
| Above 45 years old | 33 | 3.7 |
| Student level | | |
| Master | 623 | 69.8 |
| PHD | 269 | 30.2 |
| Mode of study | | |
| Full time | 733 | 82.2 |
| Part time | 159 | 17.8 |
| Currently living | | |
| On campuses | 403 | 45.2 |
| Off campuses | 489 | 54.8 |

**Table 2: Reliability analysis**

| Variables | Cranbach's Alpha |
|---|---|
| Performance expectancy | 0.947 |
| Effort expectancy | 0.910 |
| Information quality | 0.896 |
| Service quality | 0.929 |
| Perceived enjoyment | 0.976 |
| Technical support | 0.878 |
| Infrastructure support | 0.845 |
| Subjective norm | 0.759 |
| Task compatibility | 0.873 |
| DRS frequency use | 0.719 |
| DRS questions types | 0.903 |

## RESULTS AND DISCUSSION

A descriptive statistical is described in this section in order to provide a richer understanding of the students' perceptions. Table 3 summarizes the frequencies and percentages for the students' perceptions with respect to performance expectancy. The students tended to believe that using DRS will help him/her to attain gains in work performance. As described in Table 3, the majority of DRS users believed that DRS is useful in their studies and this item has the highest score (M= 5.44 SD= 1.17). However, the use of DRS in increasing the possibilities of communication with the librarian has the lowest score (M= 5.01 SD= 1.24).

**Table 3: Descriptive statistics for performance expectancy**

| Performance expectancy items | Mean | Std. Dev. |
|---|---|---|
| PE1: Using a DRS would enable me to accomplish my studies more effectively. | 5.36 | 1.19 |
| PE2: The DRS increases my effectiveness in acquiring knowledge and solving problems. | 5.40 | 1.13 |
| PE3: The DRS increases the possibilities of communication with the librarian. | 5.01 | 1.24 |
| PE4: Using a DRS, I can pose/ask questions more quickly than via traditional media. | 5.19 | 1.22 |
| PE5: Using DRS, increase my chances to save time and getting good service. | 5.42 | 1.12 |
| PE6: I would find the DRS useful in my studies. | 5.44 | 1.17 |

The descriptive statistics presented in Table 4 shows that the students tended to agree that DRS is easy to use and this item has the highest score (M= 5.13 SD= 1.13). On the other hand, they also believed that interacting with the DRS is never frustrating. On the contrary, this item has the lowest score (M= 4.82 SD= 1.20) in effecting the use of DRS.

**Table 4: Descriptive statistics for effort expectancy**

| Effort expectancy items | Mean | Std. Dev. |
|---|---|---|
| EE1: In using a DRS, my question and answering interaction with the librarian is clear and understandable. | 4.94 | 1.17 |
| EE2: I find DRS easy to use. | 5.13 | 1.13 |
| EE3: It is easy for me to become skillful at using DRS. | 5.09 | 1.13 |
| EE4: Interacting with the DRS is never frustrating. | 4.82 | 1.20 |
| EE5: I find it easy to get the DRS to do what I want it to do. | 4.98 | 1.14 |
| EE6: It is easy for me to remember how to perform tasks using the DRS. | 5.03 | 1.13 |

Table 5 provides the descriptive statistics for information quality. The students tended to agree that DRS provides reliable information and this item has the highest score (M= 5.18 SD= 1.05). They also believed that DRS can communicate information in appropriate format (M= 5.11 SD=1.07), provide accurate information (M= 5.08 SD=1.04), timely information (M= 5.08 SD= 1.08), detailed information (M= 5.07 SD= 1.10) and complete information (M= 5.04 SD= 1.08).

**Table 5: Descriptive statistics for information quality**

| Information quality items | Mean | Std. Dev. |
|---|---|---|
| IQ1: DRS provides complete information. | 5.04 | 1.08 |
| IQ2: DRS provides detailed information. | 5.07 | 1.10 |
| IQ3: DRS provides accurate information. | 5.08 | 1.04 |
| IQ4: DRS provides timely information. | 5.08 | 1.08 |
| IQ5: DRS provides reliable information | 5.18 | 1.05 |
| IQ6: DRS communicates information in an appropriate format. | 5.11 | 1.07 |

Table 6 provides the descriptive statistics for service quality. The students believed that DRS will give a professional and competence image and this item has the highest score (M = 5.02). On the other hand, the students also experienced that DRS provides follow-up service to their questions or need. However, this item has the lowest score (M = 4.91).

**Table 6: Descriptive statistics for service quality**

| Service quality items | Mean | Std. Dev. |
|---|---|---|
| **SQ1: DRS anticipates and responds promptly to my questions/needs and request.** | 4.98 | 1.08 |
| **SQ2: DRS can be dependent upon to provide whatever is promised.** | 4.95 | 1.04 |
| **SQ3: DRS instils confidence and reducing the uncertainty.** | 4.99 | 1.07 |
| **SQ4: DRS understands and adapts to my specific needs.** | 5.00 | 1.06 |
| **SQ5: DRS provides follow-up services to my questions/needs.** | 4.91 | 1.11 |
| **SQ6: DRS gives a professional and competence image.** | 5.02 | 1.09 |

The descriptive statistics in Table 7 shows that the students believed the actual process of using DRS was pleasant and this item has the highest score (M = 5.02), and the item for having fun using the DRS has the lowest score (M = 4.90) for perceived enjoyment factors.

**Table 7: Descriptive statistics for perceived enjoyment**

| Perceived enjoyment items | Mean | Std. Dev. |
|---|---|---|
| PEN1: I find using the DRS to be enjoyable. | 4.98 | 1.10 |
| PEN2: The actual process of using the DRS was pleasant. | 5.02 | 1.05 |
| PEN3: I have fun using the DRS. | 4.90 | 1.11 |

Table 8 provides the descriptive statistics for technical support. The students believed that librarians/library staff/IT support staff is competent in providing their services. In addition, they also believed it was easy to interact effectively with the librarians concerning their problems. These two items have the equal highest score (M = 5.03) for technical support factors. On the other hand, DRS user believed that they can get technical support from the librarians/ library staff/IT support staff has the lowest score (M= 4.96, SD=1.18).

**Table 8: Descriptive statistics for technical support**

| Technical support items | Mean | Std. Dev. |
|---|---|---|
| TS1: I can get technical support from the librarians/ library staff/ IT support staff. | 4.96 | 1.18 |
| TS2: Librarians/ library staff/ IT support staff is competent in providing their services. | 5.03 | 1.13 |
| TS3: I find it easy to interact effectively with the librarians concerning my problems | 5.03 | 1.16 |

Table 9 provides the descriptive statistics for IT infrastructural support. Again, the students tended to agree that the level of IT provided at the library is adequate to perform any DRS interaction and this item has the highest score (M= 5.04, SD=1.11). They also believed that the library is keeping up with advanced in IT with M = 5.03 and the library provides additional IT products to improve the quality of the DRS with M= 5.00, SD=1.14.

**Table 9: Descriptive statistics for IT infrastructure support**

| IT infrastructure support items | Mean | Std. Dev. |
|---|---|---|
| ITS1: The level of IT provided at my library is adequate to perform any DRS interaction. | 5.04 | 1.11 |
| ITS2: The library is keeping up with advances in IT. | 5.03 | 1.14 |
| ITS3: The library provides additional IT products to improve the quality of the DRS. | 5.00 | 1.14 |

Table 10 provides the descriptive statistics for subjective norms. The students believed that the library had supported them to use DRS and this item has the highest score (M = 4.86) for subjective norms factors. On the other hand, they also mentioned that generally they want to do what their friends think they should do. However, this item has the lowest score (M = 4.59).

**Table 10: Descriptive statistics for subjective norm**

| Subjective Norms Items | Mean | Std. Dev. |
|---|---|---|
| SN1: The library has supported me in using the DRS. | 4.86 | 1.17 |
| SN2: My close friends think I should use DRS. | 4.78 | 1.23 |
| SN3: Generally, I want to do what my friends think I should do. | 4.59 | 1.33 |
| SN4: People who are important to me believe I should use DRS. | 4.67 | 1.26 |
| SN5: People who are influential to me believe I should use DRS. | 4.72 | 1.23 |
| SN6: People around me think it is nice that I use DRS. | 4.71 | 1.25 |

As indicated at Table 11, the descriptive statistics for task compatibility again shows that the students tended to agree that DRS fits with their service need and this item has the highest score (M = 5.10), fit well with the way they like to work (M = 5.07) and compatible with all aspect of their work (M = 5.03).

**Table 11: Descriptive statistics for task compatibility**

| Task compatibility items | Mean | Std. Dev. |
|---|---|---|
| TC1: Using the DRS fits well with the way I like to work. | 5.07 | 1.12 |
| TC2: The DRS is compatible with all aspects of my work. | 5.03 | 1.08 |
| TC3: Using the DRS fits with my service needs. | 5.10 | 1.08 |

Table 12 details the breakdown by list of DRS for the frequency used by the scale from "never" to "more than once a day". It was expected to find that the greatest frequency of all DRS uses including e-mail usage (41.7%, n = 372), web form (30.3%, n = 270), online chat (18.4%, n = 164), Facebook (19.3%, n = 172), Instagram (13.1%, n = 117), Twitter (13.1%, n = 117), YouTube (15.4 %, n = 137) and blog (15.6%, n = 139) was "once a month" and the second rank was "a few times a month". About 16.9% (n = 151) of e-mail usage, web form (20.4%, n = 182), online chat (7.8%, n = 70), Facebook (9.2%, n = 82), Instagram (4.9%, n = 44), Twitter (4.5%, n = 40), You Tube (8.1%, n = 72) and blog (8.7%, n = 78) are responses used for "a few times a month". However, the number of users using YouTube was about the same (8.1 %, n = 72) for "a few times a month" and "a few times a week". Meanwhile, the rest used the DRS more often. The results indicate that there are certain types of DRS more likely to be used by the users and imply that DRS users are selective about where to pose problem/questions. In addition, they are not attached only to one DRS tool but visit other DRS tools before posing problem/questions.

**Table 12: Descriptive statistics DRS frequency of use**

| DRS tools | Never | Once a month | A few times a month | A few times a week | About once a day | More than once a day | Mean | Std. Dev. |
|---|---|---|---|---|---|---|---|---|
| **A1: E-mail** | 147 (16.5%) | 372 (41.7%) | 151 (16.9%) | 87 (9.8%) | 59 (6.6%) | 76 (8.5%) | 2.74 | 1.46 |
| **A2: Web Form** | 224 (25.1%) | 270 (30.3%) | 182 (20.4%) | 113 (12.7%) | 47 (5.3%) | 56 (6.3%) | 2.62 | 1.44 |
| **A3: Online chat** | 488 (54.7%) | 164 (18.4%) | 70 (7.8%) | 67 (7.5%) | 43 (4.8%) | 60 (6.7%) | 2.10 | 1.56 |
| **A4: Facebook** | 408 (45.7%) | 172 (19.3%) | 82 (9.2%) | 66 (7.4%) | 71 (8.0%) | 93 (10.4%) | 2.44 | 1.74 |
| **A5: Instagram** | 603 (67.6%) | 117 (13.1%) | 44 (4.9%) | 42 (4.7%) | 32 (3.6%) | 54 (6.1%) | 1.82 | 1.47 |
| **A6: Twitter** | 645 (72.3%) | 117 (13.1%) | 40 (4.5%) | 36 (4.0%) | 24 (2.7%) | 30 (3.4%) | 1.62 | 1.25 |
| **A7: You Tube** | 503 (56.4%) | 137 (15.4%) | 72 (8.1%) | 72 (8.1%) | 58 (6.5%) | 50 (5.6%) | 2.10 | 1.56 |
| **A8: Blog** | 550 (61.7%) | 139 (15.6%) | 78 (8.7%) | 65 (7.3%) | 28 (3.1%) | 32 (3.6%) | 1.85 | 1.35 |

Table 13 provides the descriptive statistics for DRS questions types. Again, the majority of the DRS users were found to pose questions/problem related with directional, library policies and procedure, ready reference, strategy based searching, connectivity questions, citations formatting or citation management tool and questions relating to copyrights approximately "once a month" (32.2%-42.2%) and the second rank was "a few times a month" (10.4%-21.3%). Cumulatively, only small numbers of respondents (0.4% to 7.3%), are frequent users who normally pose questions/ problem more than once per day. The results also indicate that the highest number

of students posing problem via DRS was about ready reference questions for finding a book or an articles by known title or citation (42.2%, n = 376), followed by strategy based searching types of questions (35.3%, n = 315). On the contrary, questions relating to library policies, procedure and directional questions were rarely asked which generates 44.1% response rate for never ask question relating library policies and procedure while 40.8% response rate was generated for directional questions.

**Table 13: Descriptive statistics DRS questions types**

| Indicator | Never | Once a month | A few times a month | A few times a week | About once a day | More than once a day | Mean | Std. Dev. |
|---|---|---|---|---|---|---|---|---|
| **B1: Directional questions** | 364 (40.8%) | 287 (32.2%) | 131 (14.7%) | 73 (8.2%) | 20 (2.2%) | 17 (1.9%) | 2.05 | 1.18 |
| **B2: Library policies, procedure** | 393 (44.1%) | 329 (36.9%) | 93 (10.4%) | 55 (6.2%) | 18 (2.0%) | 4 (0.4%) | 1.87 | 1.01 |
| **B3: Ready reference: Find a book or article by known title or citation** | 67 (7.5%) | 376 (42.2%) | 190 (21.3%) | 134 (15%) | 60 (6.7%) | 65 (7.3%) | 2.93 | 1.34 |
| **B4: Strategy based searching** | 137 (15.4%) | 315 (35.3%) | 173 (19.4%) | 136 (15.2%) | 70 (7.8%) | 61 (6.8%) | 2.85 | 1.42 |
| **B5: Connectivity questions.** | 335 (37.6%) | 312 (35.0%) | 110 (12.3%) | 75 (8.4%) | 37 (4.1%) | 23 (2.6%) | 2.14 | 1.27 |
| **B6: Citation formatting / citation management tools** | 304 (34.1%) | 293 (32.8%) | 119 (13.3%) | 104 (11.7%) | 36 (4.0%) | 36 (4.0%) | 2.31 | 1.36 |
| **B7: Manage copyright: Detecting and dealing with plagiarism/Turnitin software** | 325 (36.4%) | 346 (38.8%) | 118 (13.2%) | 64 (7.2%) | 18 (2.0%) | 21 (2.4%) | 2.07 | 1.16 |

Factor loadings, composite reliability, and average variance extracted were used to assess the convergent validity empirically. Important descriptive statistics are listed in Table 14. All of the factor loading estimates are greater than 0.5 and most of them (49 of the 57 factors) greater than 0.7. Meanwhile, all construct reached construct reliability (CR) values greater than 0.88 which exceed the suggested value of 0.60 recommended by [6]. In addition, all construct reached Average Variance Extracted (AVE) reliability evaluation based on AVE satisfied the recommended value of 0.50 [18].

**Table 14: Factor loadings, composite reliability, average variance extracted**

| Constructs | Item | Factor Loading | CR (Minimum 0.6) | AVE (Minimum 0.5) |
|---|---|---|---|---|
| **Performance expectancy** | PE1 | 0.84 | 0.924 | 0.672 |
| | PE2 | 0.87 | | |
| | PE3 | 0.62 | | |
| | PE4 | 0.74 | | |
| | PE5 | 0.89 | | |
| | PE6 | 0.92 | | |
| **Effort expectancy** | EE1 | 0.74 | 0.931 | 0.694 |
| | EE2 | 0.81 | | |
| | EE3 | 0.83 | | |
| | EE4 | 0.83 | | |
| | EE5 | 0.90 | | |
| | EE6 | 0.88 | | |
| **Information quality** | IQ1 | 0.85 | 0.952 | 0.769 |
| | IQ2 | 0.87 | | |
| | IQ3 | 0.88 | | |
| | IQ4 | 0.88 | | |
| | IQ5 | 0.89 | | |
| | IQ6 | 0.89 | | |
| **Service quality** | SQ1 | 0.86 | 0.944 | 0.737 |
| | SQ2 | 0.87 | | |
| | SQ3 | 0.89 | | |
| | SQ4 | 0.87 | | |
| | SQ5 | 0.81 | | |
| | SQ6 | 0.85 | | |
| **Perceived enjoyment** | PEN1 | 0.90 | 0.920 | 0.792 |
| | PEN2 | 0.90 | | |
| | PEN3 | 0.87 | | |
| **Subjective norms** | SN1 | 0.64 | 0.934 | 0.707 |
| | SN2 | 0.82 | | |

| | | | | |
|---|---|---|---|---|
| | SN3 | 0.82 | | |
| | SN4 | 0.93 | | |
| | SN5 | 0.90 | | |
| | SN6 | 0.90 | | |
| **Technical support** | TS1 | 0.88 | 0.933 | 0.823 |
| | TS2 | 0.95 | | |
| | TS3 | 0.89 | | |
| **IT Infrastructure support** | ITS1 | 0.90 | 0.938 | 0.835 |
| | ITS2 | 0.94 | | |
| | ITS3 | 0.90 | | |
| **Task compatibility** | TC1 | 0.87 | 0.933 | 0.823 |
| | TC2 | 0.93 | | |
| | TC3 | 0.92 | | |
| **DRS Frequency use** | A1 | 0.70 | 0.904 | 0.519 |
| | A2 | 0.58 | | |
| | A3 | 0.81 | | |
| | A4 | 0.84 | | |
| | A5 | 0.70 | | |
| | A6 | 0.60 | | |
| | A7 | 0.77 | | |
| | A8 | 0.64 | | |
| **DRS question types** | B1 | 0.58 | 0.887 | 0.534 |
| | B2 | 0.58 | | |
| | B3 | 0.69 | | |
| | B4 | 0.73 | | |
| | B5 | 0.84 | | |
| | B6 | 0.88 | | |
| | B7 | 0.76 | | |

The goodness-of-fit indices obtained in this study and threshold values are summarized in Table 15. The values obtained are Normed Chi-Square ($\chi 2$/ df) = 2.766, GFI= 0.856, Adjusted goodness-of-fit-index (AGFI) = 0.839, Normed fit index (NFI) = 0.917, Comparative fit index (CFI) = 0.946 and Root mean square error of approximation (RMSEA) = 0.045. This suggests that the research model for this study fits the data quite well.

**Table 15: Model-fit evaluation of the research model**

| Goodness-of-Fit Index | Threshold Value | Reference | Result Obtained |
|---|---|---|---|
| $\chi^2$/ df | < 3.00 | [20] | 2.766 |
| GFI | > 0.80 | [17] | 0.856 |
| AGFI | > 0.80 | [17] | 0.839 |
| NFI | > 0.90 | [17] | 0.917 |
| CFI | > 0.90 | [20] | 0.946 |
| RMSEA | < 0.08 | [20] | 0.045 |

The confirmatory factor analysis was conducted and the result found that the significant relationship can be seen between performance expectancy, information quality, perceived enjoyment, IT infrastructure support and subjective norms with DRS acceptances. Unfortunately, no significant relationships can be found between effort expectancy, service quality, technical support and task compatibility with DRS acceptance.

## CONCLUSION

This study was conducted based on sample data collected from 892 respondents using a survey distributed to postgraduate students of five RU libraries in Malaysia. The findings from this study provide new understanding on the determinants of user acceptance of technology within the RU libraries in Malaysia in the DRS contexts. Additionally, due of the lack of research studies on the determinants of DRS contexts from the user perspective, it was assumed that the broad statistical information provided by a quantitative technique would be useful for the library manager. The study confirms that higher levels of performance expectancy, information quality, IT infrastructure support and subjective norms lead to the use of DRS. However, no significant relationships can be found between effort expectancy, service quality, technical support and task compatibility with DRS acceptance. This disconfirmation does not imply that these constructs are unimportant. However, further investigation is needed to identify the problem areas of these constructs and implement them more effectively. In addition, the low usage of DRS implies that most DRS are not being used to their fullest capability, however their use is not affected by compatibility with prior experiences, since most of them are familiar with the DRS tools such as e-mail, Facebook, Instagram etc.

## REFERENCES


1. Bakar, A.B.A., 2012. Myths and Realities of Digital Reference Services: Perspectives of Libraries from Developing Countries. Library Management, 33 (3): 136-141.
2. Ahn, T., S. Ryu andI. Han, 2004. The Impact of the Online and Offline Features on the User Acceptance of Internet Shopping Malls. Electronic Commerce Research and Applications, 3 (4): 405-420.
3. Ahn, T., S. Ryu and I. Han, 2007. The Impact of Web Quality and Playfulness on User Acceptance of Online Retailing. Information and Management, 44 (3): 263-275.
4. Al-Busaidi, K.A. andH. Al-Shihi, 2010. Instructors' Acceptance of Learning Management Systems: A Theoretical Framework. Communications of the International Business Information Management Association, 2010:1-10.
5. Alsharif, F.F., 2013. Investigating the factors affecting on-line shopping adoption in Saudi Arabia. Phdthesis, De Montfort University, Leicester, England.
6. Bagozzi, R.P. andY. Yi, 1988. On the Evaluation of Structural Equation Models. Journal of the Academy of Marketing Science, 16(1): 74-94.
7. Baro, E., N. Edewor andG. Sunday, 2014. Web 2.0 Tools: A Survey of Awareness and Use By Librarians in University Libraries in Africa. Electronic Library, 32 (6): 864-883.
8. Bhattacherjee, A. andN. Hikmet, 2008. Reconceptualizing Organizational Support and Its Effect on Information Technology Usage: Evidence from the Health Care Sector. Journal of Computer Information Systems, 48 (4): 69-76.
9. Boateng, F. and Y Q. Liu, 2014. Web 2.0 Applications' Usage and Trends in Top US Academic Libraries. Library Hi Tech, 32 (1): 120-138.
10. Boxen, J.L., 2008. Library 2.0: A Review of the Literature. Reference Librarian, 49 (1): 21-34.
11. Tyckoson, D.A., 2016. History and functions of reference services. In: Reference and Information Service: An Introduction (Library and Information Science Text) (eds L.C. Smith and M.A. Wong) pp. 3-26. Libraries Unlimited, California.
12. Chow, A.S. and R.A. Croxton, 2013. A Usability Evaluation of Academic Virtual Reference Services. College and Research Libraries, 75 (3): 309-361.
13. Delone, W.H. and E.R. McLean, 2003. The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. Journal of Management Information Systems, 19 (4): 9-30.
14. Deng, S., Y. Liu andY. Qi, 2011. An Empirical Study on Determinants of Web Based Question-Answer Services Adoption. Online Information Review, 35 (5): 789-798.
15. Diamond, W. andB. Pease, 2001. Digital Reference: A Case Study of Question Types in an Academic Library. Reference Services Review, 29 (3): 210-219.
16. Dickson, A. andR.P. Holley, 2010. Social Networking in Academic Libraries: The Possibilities and the Concerns. New Library World, 111(11/12): 468-479.
17. Doll, W.J., W. Xia and G. Torkzadeh, 1994. A Confirmatory Factor Analysis of the End-User Computing Satisfaction Instrument.MIS Quarterly, 18 (4):43-461.
18. Fornell, C. and D.F. Larcker, 1981. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. Journal of Marketing Research, 18 (1): 39-50.
19. Glass, R. andS. Li, 2010. Social Influence and Instant Messaging Adoption. Journal of Computer Information Systems, 51 (2): 24-30.
20. Joseph F. Hair Jr and G. Tomas M. Hult, 2016. A primer on partial least squares structural equation modeling (PLS-SEM). SAGE Publications.
21. Hsiao, J.L., W.C. Wu and R.F. Chen, 2013. Factors of Accepting Pain Management Decision Support Systems by Nurse Anesthetists. BMC Medical Informatics and Decision Making, 13 (1): 1-13.
22. Hsu, C.L. and J.C.C. Lin, 2008. Acceptance of Blog Usage: The Roles of Technology Acceptance, Social Influence and Knowledge Sharing Motivation. Information and Management, 45 (1): 65-74.
23. Igbaria, M., T. Guimaraes and G.B. Davis, 1995. Testing the Determinants of Microcomputer Usage via a Structural Equation Model. Journal of Management Information Systems, 11 (4): 87-114.
24. Igbaria, M., J. Iivari andH. Maragahh, 1995. Why Do Individuals Use Computer Technology? A Finnish Case Study. Information and Management, 29 (5): 227-238.
25. Igbaria, M., N. Zinatelli, P. Cragg and A.L. Cavaye, 1997. Personal Computing Acceptance Factors in Small Firms: A Structural Equation Model. MIS Quarterly, 21 (3): 279-305.
26. Joint, N., 2008. Virtual Reference, Second Life and Traditional Library Enquiry Services: ANTAEUS. Library Review, 57 (6): 416-42.
27. William A. Katz, 2002. Introduction to reference work. Mc Graw Hill.
28. Keller, C., S. Hrastinski and S. Carlsson, 2007. Students Acceptance of E-Learning Environments: A Comparative Study in Sweden and Lithuania. In the Proceedings of the 2007 European Conference on Information Systems, pp: 395-406.
29. Kim, D.R., B.G. Kim, M.W. Aiken and S.C. Park, 2006. The Influence of Individual, Task, Organizational Support, and Subject Norm Factors on the Adoption of Groupware. Academy of Information and Management Sciences Journal, 9 (2): 93-110.
30. Kroski, E., 2007. The Social Tools of Web 2.0: Opportunities for Academic Libraries. Choice, 44 (12): 2011-2021.

31. Bhatt, R.K. andA. Kumar, 2014. Student Opinion on the Use of Social Networking Tools by Libraries: A Case Study of Jawaharlal Nehru University, New Delhi. Electronic Library, 32 (5): 594-602.
32. Kuruppu, P.U., 2007. Evaluation of Reference Services: A Review. Journal of Academic Librarianship, 33 (3): 368-381.
33. Lee, S.M., I. Kim, S. Rhee andS. Trimi, 2006. The Role of Exogenous Factors in Technology Acceptance: The Case of Object-Oriented Technology. Information and Management, 43 (4): 469-480.
34. Leykam, A. andC. Perkins, 2007. Is This the Right Tool for Our Library? A Look at E- Mail Virtual Reference Use Patterns. Reference Librarian, 48 (1): 1-17.
35. Li, P., 2013. Effect of Distance Education on Reference and Instructional Services in Academic Libraries. Internet Reference Services Quarterly, 18 (1): 77-96.
36. Ismail, L., 2013. Closing the Gap: Determining the Library Help-Seeking Preferences of Adult Learners in a Graduate Social Work Program. Reference and User Services Quarterly, 53 (2): 164-173.
37. Mahmood, K. and J.V. Richardson Jr, 2011. Adoption of Web 2.0 in US Academic Libraries: A Survey of ARL Library Websites. Program, 45 (4): 365-375.
38. McClure, H. and P. Bravender, 2013. Regarding Reference in an Academic Library: Does the Desk Make a Difference? Reference and User Services Quarterly, 52 (4): 302-308.
39. Milstein, S., 2010. Twitter for Libraries (and Librarians). Online, 29 (5): 17-18.
40. Nicholas, P., 2011. Creating a Digital Reference Agenda for Academic Libraries in Jamaica: An Exploratory Case Study. Libri, 61 (4): 258-280.
41. Jum C. Nunally and Ira H. Bernstein, 1978. Psychometric theory. McGraw-Hill.
42. Or, C.K., B.T. Karsh, D.J. Severtson, L.J. Burke, R.L. Brown and P.F. Brennan, 2011. Factors Affecting Home Care Patients' Acceptance of a Web-Based Interactive Self-Management Technology. Journal of the American Medical Informatics Association, 18 (1): 51-59.
43. Petter, S., W. DeLone and E.R. McLean, 2013. Information Systems Success: The Quest for the Independent Variables. Journal of Management Information Systems, 29 (4): 7-62.
44. Qin, L., Y. Kim, J. Hsu and X. Tan, 2011. The Effects of Social Influence on User Acceptance of Online Social Networks. International Journal of Human-Computer Interaction, 27 (9): 885-899.
45. Ramos, M.S. and C.M. Abrigo, 2012. Reference 2.0 in Action: An Evaluation of the Digital Reference Services in Selected Philippine Academic Libraries. Library Hi Tech News, 29(1): 8-20.
46. Salim, B., 2012. An Application of UTAUT Model for Acceptance of Social Media in Egypt: A Statistical Study. International Journal of Information Science, 2 (6): 92-105.
47. Schaper, L.K. and G.P. Pervan, 2007. ICT and OTs: A Model of Information and Communication Technology Acceptance and Utilisation by Occupational Therapists. International Journal of Medical Informatics, 76: S212-S221.
48. Singeh, F.W., A. Abrizah and N.H.A. Karim, 2013. Malaysian Authors' Acceptance to Self-Archive in Institutional Repositories: Towards a Unified View. Electronic Library, 31 (2): 188-207.
49. Stuart, D., 2010. What are Libraries Doing on Twitter? Online, 34 (1): 45-47.
50. Sun, Y., A. Bhattacherjee and Q. Ma, 2009. Extending Technology Usage to Work Settings: The Role of Perceived Work Compatibility in ERP Implementation. Information and Management, 46 (6): 351-356.
51. Tarhini, A., K. Hone and X. Liu, 2013. Factors Affecting Students' Acceptance of E-Learning Environments in Developing Countries: A Structural Equation Modeling Approach. International Journal of Information and Education Technology, 3 (1): 54-59.
52. Thong, J.Y., W. Hong and K.Y. Tam, 2002. Understanding User Acceptance of Digital Libraries: What Are the Roles of Interface Characteristics, Organizational Context, and Individual Differences? International Journal of Human-Computer Studies, 57 (3): 215-242.
53. Vaughan, K.T.L., B.E. Hayes, R.C. Lerner, K.R. McElfresh, L. Pavlech, D. Romito, L.H. Reeves and E.N. Morris, 2013. Development of the Research Lifecycle Model for Library Services. Journal of the Medical Library Association, 101(4): 310-314.
54. Venkatesh, V., 2000. Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. Information Systems Research, 11(4): 342-365.
55. Venkatesh, V. and H. Bala, 2008. Technology Acceptance Model 3 and a Research Agenda on Interventions. Decision Sciences, 39(2), 273-315.
56. Venkatesh, V., M.G. Morris, G.B. Davis and F.D. Davis, 2003. User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27 (3): 425-478.
57. Dollah, W., W.A. Kadir and R.A. Kadir, 2010. Academic Digital Library in Malaysia: A Case Study on the Status of Digital Reference Services. In the Proceedings of the 2010 National Seminar on Information Technology in the Library, pp: 1-12.
58. Warner, D.G., 2001. A New Classification for Reference Statistics. Reference and User Services Quarterly, 41 (1): 51-55.
59. Wordofa, K.H., 2014. Adoption of Web 2.0 in Academic Libraries of Top African Universities. Electronic Library, 32 (2): 262-277.
60. Yun, H., C.C. Lee, B.G. Kim and W.J. Kettinger, 2011. What Determines Actual Use of Mobile Web Browsing Services? A Contextual Study in Korea. Communications of the Association for Information Systems, 28 (1): 313-328.