e-ISSN 2320 –7876 www.ijfans.org
Vol.11, Iss.11, Nov. 2022


# FACTOR ANALYSIS FOR IMPACT OF WEB RESOURCES AMONG ENGINEERING COLLEGE TEACHERS IN KANYAKUMARI DISTRICT SOUTH INDIA

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**Abstract**

The width and scope of knowledge in this modern age has become extensive and diverse which has made full education within the wall of classrooms impossible. Hence, the need for good and standard libraries in colleges cannot be ignored. The quality of any education depends on the library it has or owned. College library aids in carrying out the education plan successfully. College library contributes to the total development of its users. The college library exists to provide a range of learning opportunities for both large and small group as well as individuals with a focus on intellectual content, information literacy and the learner. In addition to classroom visits with collaborating teachers, the college library also serves as a learning space for teachers to do independent work. The importance of college library cannot be over emphasized. A library is an important source of knowledge to young minds in colleges. It develops the important habit of reading among the teachers. The college library plays a great role in the life of teachers by serving as the store house of knowledge.. While the role of the college library remains constant, its design, digital platform, strategies and tools could change as technology changes. Hence this study give the information regarding

**Key Words:** Library, Resources, Technology, Information

## Introduction

Factor Analysis is aimed at grouping the original input variables into factors that underline the input variables. Each factor will account for one or more input variables. Theoretically, the total number of factors in the factor analysis is equal to the total number of input variables. But after performing factor analysis, the total number of factors in the study can be reduced by dropping the significant factors based on certain criteria. It is possible to select weights or factor score coefficients so that the first factor explains the largest portion of the total variance. Then the second set of weights can be selected so that the second factor accounts for most of the residual variance, subject to being uncorrelated with the first factor. The same principle could be applied for selecting additional weights for the additional factors. Thus, the factors can be estimated so that their factor scores, unlike the value of the original variables, are not correlated. Furthermore, the first factor accounts for the highest variance in the data; the second factor is the second-highest, and so on.

## Review of Literature

**Santhi (2016**) undertaken a research to identify and document how the resources and services of libraries are being utilized by the students of two engineering college libraries (PESITM and JNNCE) in Shivamogga city. Study sample consisted of 194 students from two colleges. **Prabakaran*et al*** **(2009)**The findings of factor analysis of the study revealed that the difficulties in locating the

needed materials by the students and lack of latest collection are true for both college libraries, and are the major causes amongst other problems. **Ronald Bituka (2016)** undertook a study to investigate the use of integrated library system (ILS) in academic library operations in Edo and Delta states. This study adopted a descriptive survey research design. Total enumeration was used since the population consisting 88 academic librarians in Edo and Delta states is not large and was considered appropriate to achieve the purpose of this study.

## OBJECTIVE OF THE STUDY

Considering the statement of the problem and significance of the study, the following objectives were considered:

- To Study the utilization of library resources among Engineering College Teachers in Kanyakumari district.
- To construct and adopt the significant development activities and usage of Library resources by college teachers

## HYPOTHESIS OF THE STUDY

Based on the objective of the study, the following general hypothesis were formulated in this present study:

To give a specific focus to the objectives, hypotheses have been formulated to test the objectives in clear terms using appropriate statistical tools. For testing purposes, some of the research questions of the study are converted into hypothesis. The study involves two hypotheses which are listed down and proved .Following null hypotheses are formulated for the study.

1. $H_{01}$ - There is no significant difference in the information service in Engineering colleges
2. $H_{02}$ - There is no significant development activities and usage of Library resources by college teachers

## ANALYSIS AND INTERPRETATION

### 1 Factor Analysis For Impact Of Web Resources

Factor analysis helps to reduce the innumerable variables into a limited number of latent factors having inter-correlation within them. Hence factor analysis is attempted to reduce the numerous variables into a limited number of factors. To apply factor analysis, the basic assumption to be fulfilled is the factorability of the correlation matrix. KMO measures of sampling adequacy and Bartlett's test of sphericity determine the factorability of the correlation matrix. The results of the calculation are presented below:

**Table 1**
**Factors Influencing to use Library Services - KMO and Bartlett's Test**

| KMO and Bartlett's Test | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | 0.838 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 4091.308 |
| | Df | 105 |
| | Significant | 0.000 |

Source : Computed Data

Table 1 shows that the KMO is 0.838 which indicates that the degrees of common variance among the variables are quite high and therefore Factor Analysis can be conducted.

### 2 Factor Analysis – Analytical Framework

Factor Analysis is aimed at grouping the original input variables into factors that underline the input variables. Each factor will account for one or more input variables. Theoretically, the total number of factors in the factor analysis is equal to the total number of input variables. But after performing factor analysis, the total number of factors in the study can be reduced by dropping the significant factors based on certain criteria.

There are several methods available for factor analysis. But the principal factor method with orthogonal varimax rotation is mostly used and widely available in factor analytics computer programs. One of the outcomes of a factor analysis is called a rotated factor matrix, a table of co-efficient that expresses the relation between the variables and the factors that have been prepared. The sum of squares of the factor loadings of a variable is called communalities ($h^2$).

The communalities of a factor are its common factor variance. The factor where factor loading is 0.50 or greater is considered a significant factor. This limit is chosen because it had been judged that factors with less than 50 percent common variations with the rotated factors pattern are too weak to report.

In the present study, the principal factor analysis method with orthogonal varimax rotation is used to identify the significance of different variables of the factors influencing the use of internet banking services. The estimated results are given in Table 5.2.

Mathematically factor analysis is somewhat similar to multiple regression analysis. In factor analysis, each variable is expressed as a linear combination of the underlying factors. The amount of variance, a variable that shares with all the other variables included in the analysis is referred to as communality. The co-variation among the variables is described in terms of a small number of common factors plus a unique factor for each variable. These factors are not over observed. If the variables are standardized, the factor model may be represented as:

$X_i=A_{ij}F_1+A_i2F_2+A_i3F_3+.....+A_{im}F_m+V_iU_i$

Where,

$X_i$ = $i^{th}$standardized variable

$A_{ij}$= standardized multiple regression coefficient of variable i on common factor $_j$

F = common factor

$V_i$ = standardized regression coefficient of variable I on unique factor i

$U_i$ = the unique factor for variable i

M = number of common factors

The unique factors are uncorrelated with each other and with the common factors. The common factors themselves can be expressed as a linear combination of the observed variables.

$F_i=W_{i1}X_1+W_{i2}X_2+W_{i3}X_3+.....+W_{ik}+X_k$

Where

$F_i$ = estimate of $i^{th}$ factor

$W_i$ = weight or factor score coefficient

K = number of variables

It is possible to select weights or factor score coefficients so that the first factor explains the largest portion of the total variance. Then the second set of weights can be selected so that the second factor accounts for most of the residual variance, subject to being uncorrelated with the first factor. The same principle could be applied for selecting additional weights for the additional factors. Thus, the factors can be estimated so that their factor scores, unlike the value of the original variables, are not correlated. Furthermore, the first factor accounts for the highest variance in the data, the second factor is the second-highest, and so on.

**Table 2 Results of the Factor analysis**

| Factors | F1 | F2 | F3 | F4 | F5 | $h^2$ |
|---|---|---|---|---|---|---|
| Conventional e-Resources | **.606** | .022 | .037 | .294 | -.041 | .874 |
| Databases | **.715** | -.235 | -.124 | -.041 | -.029 | .897 |
| Digital Archives | **.915** | -.125 | -.187 | -.098 | -.041 | .999 |
| e-Journals | -.012 | **.933** | .179 | -.148 | -.026 | .389 |

| | | | | | | |
|---|---|---|---|---|---|---|
| e-Books | -.218 | **.804** | .161 | .324 | -.043 | .487 |
| Electronic groups /Discussion group | -.235 | **.751** | -.001 | -.144 | -.054 | .185 |
| Electronic Thesis and Dissertations(ETD) | -.209 | -.285 | **.739** | -.005 | -.036 | .929 |
| Institutional Repositories | -.358 | .107 | **.725** | -.101 | .026 | .961 |
| FAQ's(Frequently Asked Questions) | -.269 | .245 | **.715** | -.154 | .073 | .393 |
| Internet Discussion Forum | -.164 | -.283 | .162 | **.804** | -.173 | .926 |
| Library Networks | -.044 | -.103 | -.151 | **.748** | .002 | .961 |
| Library Websites/OPAC | -.233 | .185 | .276 | **.671** | -.045 | .813 |
| Online Reference Sources | .275 | -.218 | .065 | .200 | **.732** | .833 |
| Open access sources | -.045 | -.035 | -.014 | .030 | **.720** | .931 |
| Virtual conference | -.009 | -.018 | -.005 | .027 | **.734** | .857 |

**The Impact of web Resources**

The rotated factor matrix for the variables relating to the factors influencing the use of library web resources is presented in Table 2 which shows the loading received by the factors under $F_1$, $F_2$, $F_3$, $F_4$, and $F_5$.

**Rotated Factor Matrix with Communalities**

Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization. Source: Computed data.

Table 1 represents the matrix of common factor co-efficient or factor loadings. The number of factors extracted was five. The ratios which have the highest loadings in each factor are grouped, that is the ratios that are more closely related to a particular group are boxed. The last column in the table is communality ($h^2$) which is the variance explained by the factor. The group-wise analysis is shown in the individual tables. The rotated factor loadings for fifteen statements have been extracted into five factors.

**Factor I ($F_1$)**

The factor I present the relevant three variables such as Conventional e resources, Databases, Digital Archive and their respective factor loadings.

**Table 3 Factor I Digital database Factor**

| Sl.No. | Variables | Factor Loading | Communality ($h^2$) |
|---|---|---|---|
| 1. | Conventional e resources | .983 | .459 |
| 2. | Databases | .915 | .661 |
| 3. | Digital Archives | .606 | .203 |

Source: Computed data.

It is inferred from factor I that, three variables such as Conventional e resources (0.983), Databases (0.915), and Digital Archives (0.606) are having the highest significant positive loadings. Hence, factor I is characterized as the "Digital database Factor".

**Factor II ($F_2$)**

In the second factor, there are three variables such as improved service and increased in the utilization of e-Journals, e- books, Electronic group or discussion purposes and their factor loadings are presented in Table 3

**Table 4 Factor II Electronic Factor**

| Sl. No. | Variables | Factor Loading | Communality ($h^2$) |
|---|---|---|---|
| 1. | e-journals | .812 | .666 |
| 2. | e-books | .801 | .664 |
| 3. | Electronic uses | .751 | .945 |

Source: Computed data.

It is inferred from Table 5.4 that there are three variables with high factor loadings such as e-Journals (0.812), e-books (0.801) and electronic uses (0.751) has the highest significant positive loadings. Hence, factor II is characterized"Electronic factor".

**Factor III ($F_3$)** Electronic thesis and dissertation, Institutional repositories, FAQ and their factor loadings on factor III as depicted in Table 4

**Table 5 Factor III Information factor**

| Sl. No. | Variables | Factor Loading | Communality ($h^2$) |
|---|---|---|---|
| 1. | Electronic Thesis and dissertation | .739 | .855 |
| 2. | Institutional repositories | .725 | .875 |
| 3. | FAQ | .715 | .997 |

Source: Computed data.

The third factor consists of three variables Electronic Thesis and dissertation (0.739), Institutional repositories (0.725), and FAQ (0.715) are having the highest significant positive loadings. Hence factor III is characterized as the "Information and Download factor"

**Factor IV ($F_4$)**

Factor four contains three variables such as Internet discussion forum, Library networks, Library websites' and their factor loadings on factor IV as depicted in Table 5

**Table 6 Factor IV Network Factor**

| Sl. No. | Variables | Factor Loading | Communality ($h^2$) |
|---|---|---|---|
| 1. | Internet discussion forum | .804 | .188 |
| 2. | Library networks | .748 | .476 |
| 3. | Library websites | .671 | .128 |

Source: Computed data.

Factor four contains three variables like Internet discussion forum (0.804), library networks (0.748), and library websites (0.671), with high factor loadings. Hence factor four is characterized as the "Network factor".

**Factor V ($F_5$)**

Factor V explains the three variables such as online reference sources, open access sources and virtual conference and their respective factor loadings.

**Table 7 Digital Factors V Online Sources**

| Sl.No. | Variables | Factor Loading | Communality ($h^2$) |
|---|---|---|---|
| 1. | Online reference sources | .732 | .902 |
| 2. | Open access sources | .720 | .974 |
| 3. | Virtual conference | .624 | .212 |

Source: Computed data.

The fifth factor shows the four variables such as online reference sources (0.732), open access sources (0.720), and virtual conference (0.624) and has the highest significant positive loading. Hence factor V is the digital factor.

## CONCLUSION

It's a precious exercise when the result handed by the experimenter needs to be enforced by a policymaker in the field of study The present study has achieved its aim of assessing the present status ofEngineering college libraries in Kanyakumari District .The study has provided a useful summary of the current state of affairs of the Engineering college libraries of kanyakumari district. It is found that information resources both in traditional as well as digital mode of utilize the library resources among the college teachers .The college libraries are below the expected level and most of the libraries are not providing sufficient electronic information resources and services.

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