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DESIGN AND DEVELOPMENT OF SELF LEARNING GUIDE FOR TECHNICAL PUBLICATION DEPARTMENT USING AHP APPROACH

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ABSTRACT

A Self-learning guide is a standard document used by reputed companies for documenting the work process that is accountable and provides information at any point of time. Thus, a self-learning guide acts as a measure which demonstrates management's accountability and records the professional practices of a company. This paper attempts to prioritize those factors that can be made use to develop a self-learning guide from the factors that is taken in a general perspective of documentation procedure through literature review for technical publication domain. This study uses Analytical Hierarchy Process method to select the most appropriate factors that can be used in developing the self-learning guide. This study uses four criteria such as language, design, content and relationship that enable to develop a self-learning guide. The results reveal that AHP method helped to measure, rank and choose those factors that is required in developing the self-learning guide. The research findings revealed that the content criterion was the most favored criterion followed by relationship, design and language. The most important factor are relevance factor followed by action, alignment, contact, subject and the

least important factor are tone, impression and plain words that can be made use in developing the self-learning guide.

Key Words - Analytical hierarchy process, Self-learning guide, Technical Publication, Technical Writing

INTRODUCTION

In the present scenario the companies make use of self-learning guides to make the employees accountable for providing information, improving operational efficiency as it provides background history and acts as a proof to safety plans. The reason for developing a self-learning guide is to give a clear information on what are the processes that one needs to be doing in the departments as it creates a new improved approach to look in to problems faced during the work. A self-learning guide also acts one of the materials that is accountable to provide information at any given time and it also helps in reducing the time in the routine works and also provides service improvements. The self-learning guides enable the professionals to use previous, present as well as the latest information, which facilitates continuous output. Accurate and factual self-learning guides provide hard and trustworthy records of the work process and acts as an accurate documentary for the previously done work. A guide demonstrates the Managements accountability and records their professional practice. Thus self-learning guide should be developed by prioritizing those criterions that are taken from a general perspective of documentation procedure.

LITERATURE REVIEW

Technical documents are usually written to complete the report which will be usually asked by the immediate superior.**Anastasi (1971), Blake and Bly (1993)** have mentioned in their studies that technical documents completes the job when downsizing happens in the industries where an individual has to do those work which is not under his domain at this time these technical documents serves as a guide to the employee.

G. Blake & R.B. Bly (1993) and J.M. Lannon, (1988) focused on the factors relating to the technical content of the guides.**Atkinson et al. (2007) and Liberman et al. (2002)**, says that the writer has to be very careful while writing down the technical documents and to make the right usage of texts and sentences in such a manner that it made use by the right audience. It also talks

about the level of conceptual difficulty that the reader is capable of understanding which is to be appropriate.

R.H. Fiske (1996), J. Gibaldi (1999) have worked tremendously to bring out many factors in developing the technical documents such as technical self-learning guides. Their work is broadly classified to three sections those are Technical Content, Presentation and language skills. In technical content the first they talked about was the proper word usage such as the patent document requires different word usages then the technical report.

Wright (1981), Wright, Crieghton and Threlfall (1982), in their study showed that people refer asking expert than understanding the complicated documents by themselves. Their study revealed that reader asks help to understand the content which leads us to the fact that a clear contact detail should be established while communicating information in the technical documents.

Harker and Vargas (1987) defined analytical hierarchical process as a framework, "which is designed to deal with the intuitive, the rational and the irrational when we make multiple objectives, criterions and decisions with or without certainty for any quantities of alternatives".

Eddie Cheng and Heng Li, (2001) says in their study that the selection of process carried out by AHP procedure is very transparent. It brings out the relative advantages of alternative solutions in a Multi Criteria Decision Making (MCDM) problem and it is a subjective methodology.

Ruchi Garg Zillur Rahman and Quareshi Ishwar Kumar, (2012) says that a decision-maker of the company can use direct questioning or a questionnaire method to obtain information and the priority weights of elements. In spite of many approaches, AHP is considered to be the most effective methodology in prioritization of criterions. AHP is also adept in treating large number of criteria and sub criteria's proficiently.

Sakuja S and Jain v (2012) analyzed the collaboration of different service operations of different organizations to satisfy customers. The basic model is constructed which consists of different elements and various decision criteria which can easily fit in the service SC so that performance can be optimized.

Rabihah Md.Sum and Norlida Mahussin(2016) mentioned that AHP is a useful and practical decision making tool for personal financial planning. It increases transparency of a problem by structuring criteria and alternatives of a problem in a hierarchy.

Pankaj Agarwal, Hamant Asati, Dharmendra Gour (2016) in their study stated that AHP approach creates a new interest because of simplicity and ease of its application. It has various advantages over previously adopted approaches due to the inclusion of weightage of factors and a combined structure of selection criteria.

OBJECTIVE OF THE STUDY

1. To identify the factors for developing the self-learning guide.
2. To analyse and prioritize the factors for developing the self-learning guide.
3. To rank the best suitable factors among the overall factors to develop the self-learning guide.

RESEARCH METHODOLOGY

The methodology carried out for this study is through interview method and Analytical Hierarchy Process. The interview method is used to collect the data and opinion from the employees. The Analytical Hierarchy Process is used for analyzing and prioritizing the important factors from the selected factors through various literatures. Analytical Hierarchy Process is possibly the most dominant and the most widely used approach in prioritization process. AHP has also proved helpful to convert those immeasurable aspects in to measureable aspects which will help to draw the results or conclusions.

The factors identified from the literature survey contain the relative studies carried out by other authors supporting these factors criteria wasestablished to evaluate the factors. The four main criteria's got from literature review are Design, Relationship, Language and Content. Language criteria isabout the ease the reader feels in understanding the words. Design criteria give the visual feel of the document and its design enhances the usability. Relationship criteria depict how far a document establishes a relationship with its users. Content criteria reveals about the content and the way the content is organized to deliver the document's purpose. The table 1 contains different factors and the authors who contributed their relevant studies on these factors.

Table 1. Factors from the Literature

Factors	Name of Authors
Directness	Christopher Hirsch & Jeremy Hartman (2006),Bethany Davies (2000),Fernando Ferreira (2003), Katheryn Riley & Jo Mackiewicz (2002)
Plain words	Allan pavilion (1971), Paula Lien do (2001),Wheeler (1970), Fulcra et al (1981)
Grammar and punctuation	De Beaugrande (1984), Cohen et al.(2001), baron (2001), Yuan Li & Jim X. Chen (2014)
Readability	Coleman (1962), Paivio (1971), Just & Clark (1973), JurgenBorstler& Barbara Peach (2016)
Legibility	Tinker (1963), Spencer (1968), Wright &Lickorish (1983), Lew et al.(2015)
Graphic elements	Glynn &DiVesta (1979), Waller &Whalley (1987), ZdenaDobesova& Petr Dobes (2012)
Structure	Armbruster (1984), Brown (1980), Baker & Brown (1984)
Impression	Swales (1990), Harper &Shatwell(2002), Akai et al(2014)
Who from	Harper &shatwell (2002), petty &cacioppo (1983, 1984), H. Ericksson (2013)
Contact	Wright (1981), Wright, Creighton and Threlfall (1982), S. C. Geonetta (2005)
Audience fit	Atkinson et al.(2007), Liberman et al. (2002), Jonathan MamangkiangMantikayan& Media A. Ayu (2013)
Tone	Brown & Yule (1983), Gibbs & Steen (1999), Tian et al. (2004)
Relevance	Kiirsch (2001), Just & Clark (1973), Zhong et al. (2007)
Subject	Ausubel (1963), Hartly&davies (1976), Petersson et al.(2000)
Action	Novick& Morse (2000)
Alignment	Iyenger&lepper (2000), Kahneman&Tversky (1979), Siederdissen (2015)

Before conducting AHP analysis the data's are collected by having the consensus of the team. These consensuses are collected as an input for the pair wise comparison of the factors. The method applied to collect these data's is through consensus decision making method as the group consist of 9 members it is hard to go for a quantitative approach to collect the data that is through surveys or questionnaires. Hence the qualitative approach is used to collect the consensus for the pair wise comparison. The below figure will show in brief the steps used in collecting the consensus through consensus decision making method.

After the discussion, a meeting was arranged to collect the responses from the employees of the technical publication team regarding the mentioned factors in terms of their consensus on these factors. In this meeting, the team members consisting of 9 employee's consensus are collected. The employees were asked to rate the factors in pair wise both at level 1 and level 2 by rating the factors from 1 to 9 in a pair wise comparison manner. The responses were recorded only after the

whole group came in to common consensus or in other words agreed upon the same numerical rating.

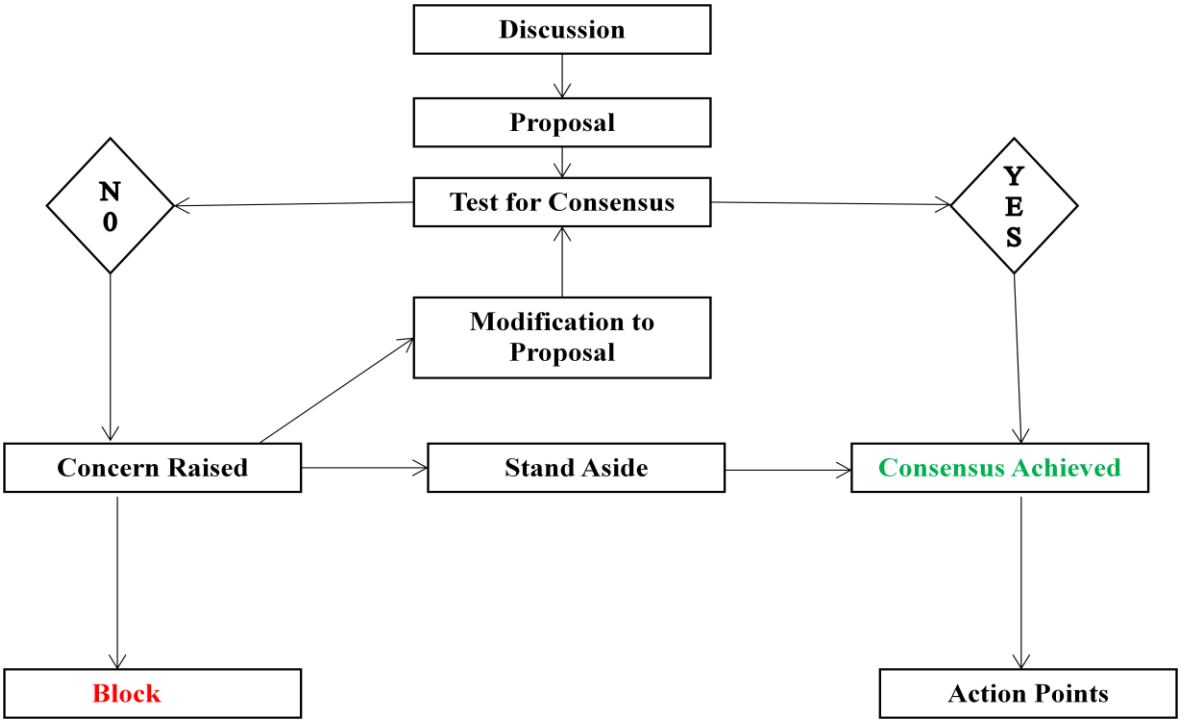

Figure 1. Consensus Decision Making Procedure

The Analytic Hierarchy Methodology

Experts in various areas have recognized AHP process as a very powerful method in bringing out the best choices that are available from the lots.AHP process enables to compare either the qualitative and quantitative data's or findings to reach the desired objective.AHP methodology uses verities of qualitative and mathematical process to infer the result from various data and from this collected data a valid conclusion is drawn out.

One to one comparisons are made to identify the one which is more preferred then the other. One to one comparison is done to find the relative importance amongst the two variables that are taken in to study and these factors is rated by the nine point scale. This rating was prepared and developed by Saaty (Taylor, 2010). The scale has a rating from number 1 to 9 which reflects the level of importance from equal, moderate, strong, very strong to extreme level by 1,3,5,7 and 9, respectively.2, 4, 6, 8 denotes intermediate values between two adjacent comparison. This nine point scale is found to be more scientific and reasonable way for comparing two variables. If one

variable is considered absolutely more important than the other then it is rated as 9. If the same variable is considered absolutely less important than the other then it is rated as 1/9. This type of one to one comparisons are carried out for all the factors that has been mentioned in this study

The goal of this research is to find out the most relevant and relative importance of the various factors that are taken in general aspect of developing document procedures from the literature reviews. To reach this particular goal, the mathematical steps that are provided by (Taylor, 2010) was used and the steps used are carried out as below:

I. Prepare a one to one comparison matrix for each decision alternative (factors) under each criterion
II. The normalization methodology is carried as below
    a. Summing up the ratings of each column of the one to one comparison matrices.
    b. Each ratings of every column of the one to one comparison matrices are divided by the corresponding column sum. This has to be done for all the comparison matrices that are prepared. The resulting values represent the normalized matrices.
    c. The preference vectors is found by computing the average values of each row of the normalized matrices
    d. The vectors of preferences for each criterion (from step ii c) are combined into one preference matrix which shows the preference for each alternative for each criterion.
III. Prepare a one to one comparison matrix for criteria.
IV. The normalized matrix is computed by dividing each value in each column of the matrix by the corresponding column sum.
V. The preference vector is prepared by computing the row averages for the normalized matrix.

Table 2. The AHP One to One Comparison Ratings between Two factors or Alternatives

Verbal Judgment or Preference	Numerical Rating
Equally Preferred	1
Equally to Moderately Preferred	2
Moderately Preferred	3
Moderately Preferred to Strongly Preferred	4
Strongly Preferred	5
Strongly to Very Strongly Preferred	6
Very Strongly Preferred	7
Very Strongly to Extremely Preferred	8
Extremely Preferred	9

Source: Taylor (2010)

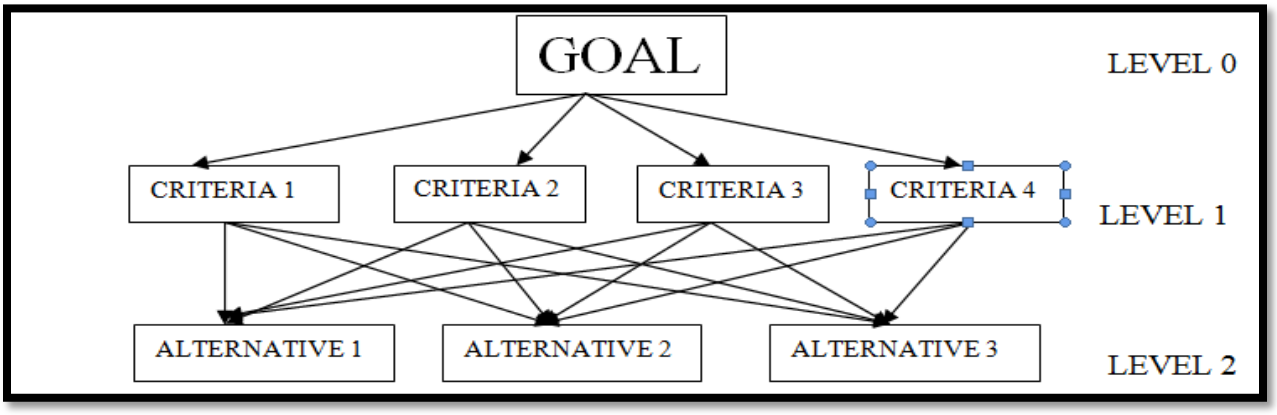

Figure 2. Traditional AHP Model: Goal, Criteria and Alternatives or factors

Source: Saaty (2008)

After computing the preference matrix for both the alternatives as well as for the criteria's these preference vectors are nothing but the local weights of level 1 and level 2. By multiplying the local weights of level 1 and level 2 we get what is called the global weights. These global weights are calculated to assign the ranking and the sum of all the global weights should be equal to 1. Otherwise, we have to repeat the whole process.

Consistency check

The other part of the AHP process is to check for the consistency which measures how much or with what our judgments are consistent even when it is tested amongst the large sample of judgments. This study involves four main criteria they are language, relationship, content, design criteria's. These are four main criteria's that form the level 1 in the AHP process. Under each of this criteria's there are four alternatives, each of these forms the level 2 in the AHP process. According to Saaty, the judgments are perfectly consistent when consistency ratio is 0 and there is no need to repeat the process. If the consistency ratio is above 0.1 then the process must be repeated, and the judgments are inconsistent, random and untrustworthy.

The consistency reliability is given by the formula (CR) =CI/RI, wherein CI is the consistency index of the judgments and RI is the index of the same corresponding random matrix used for comparison. RI is provided by the table 3 and table 4. In both the tables, (n) is the order of the random matrix and corresponding values are the index of consistency for random judgments (R.I).

Table 3. RI = 3 to 9

n	3	4	5	6	7	8	9
R.I	0.52	0.88	1.10	1.24	1.34	1.40	1.44

Source: Alonso and lamata (2006)

Table 4.RI values for different values of n= 10 to 16

n	10	11	12	13	14	15	16
R.I	1.48	1.51	1.53	1.55	1.57	1.58	1.59

Source: Alonso and lamata (2006)

Consistency index is (CI) = $[\lambda_{avg}-n]/[n-1]$. Now consider the equation $[Ax=\lambda_{avg}\ x]$, where A refers to the preference matrix and x refers to the eigenvector. The formula for λ_{avg} can be got by rearranging the equation for A_x as mentioned before, so $\lambda_{avg=}$average $\left| A_X/X \right|$

ANALYSIS USING AHP METHODOLOGY:

The analysis and discussion aspect of AHP process is presented in this section.

Table5. Pair-Wise Comparison Matrix with respect to Criteria

FACTORS	LANGUAGE	DESIGN	RELATIONSHIP	CONTENT
LANGUAGE	1	0.5	0.33	0.2
DESIGN	2	1	0.5	0.17
RELATIONSHIP	3	2	1	0.25
CONTENT	5	6	4	1

Table 6. Pair-Wise Comparison Matrix of Alternatives in Design Criteria

FACTORS	GRAPHIC	LEGIBILITY	IMPRESSION	STRUCTURE
GRAPHIC	1	3	2	2
LEGIBILITY	0.33	1	2	2
IMPRESSION	0.5	0.5	1	0.5
STRUCTURE	0.5	0.5	2	1

Table 7. Pair-Wise Comparison Matrix of Alternatives in Relationship Criteria

FACTORS	WHO FROM	AUDIENCE FIT	TONE	CONTACT
WHO FROM	1	0.5	6	0.25
AUDIENCE FIT	2	1	5	0.33
TONE	0.17	0.2	1	0.14
CONTACT	4	3	7	1

Table 8. Pair-Wise Comparison Matrix of Alternatives in Content Criteria

FACTORS	RELEVANCE	SUBJECT	ALIGNMENT	ACTIONS
RELEVANCE	1	3	2	2
SUBJECT	0.33	1	0.33	0.5
ALIGNMENT	0.5	3	1	0.5
ACTIONS	0.5	2	2	1

Table 9. Pair-Wise Comparison Matrix of Alternatives in Language Criteria

FACTORS	DIRECTNESS	PLAIN WORDS	READABILITY	GRAMMER
DIRECTNESS	1	2	3	2
PLAIN WORDS	0.5	1	0.5	2
READABILITY	0.33	2	1	2
GRAMMER	0.5	0.5	0.5	1

Table 10. Normalized Score Tables for Criteria (Level 1)

FACTORS	LANGUAGE	DESIGN	RELATIONSHIP	CONTENT	ROW TOTAL	LOCAL WEIGHTS	WEIGHTS IN %
LANGUAGE	0.09	0.05	0.05	0.12	0.32	0.08	8
DESIGN	0.19	0.10	0.09	0.10	0.47	0.12	12
RELATIONSHIP	0.27	0.21	0.17	0.15	0.81	0.20	20
CONTENT	0.45	0.63	0.69	0.63	2.40	0.60	60
TOTAL	1	1	1	1	4	1	100

Table 11. Normalized Score Tables for Alternatives of Design Criteria (Level 2)

FACTORS	GRAPHIC	LEGIBILITY	IMPRESSION	STRUCTURE	ROW TOTAL	LOCAL WEIGHTS	WEIGHTS IN %
GRAPHIC	0.43	0.6	0.29	0.36	1.68	0.42	42
LEGIBILITY	0.14	0.2	0.29	0.36	1.00	0.25	25
IMPRESSION	0.22	0.1	0.14	0.10	0.54	0.14	14
STRUCTURE	0.21	0.1	0.28	0.18	0.78	0.19	19
TOTAL	1	1	1	1	4	1	100

Table 12. Normalized Score Tables for Alternatives of Relationship Criteria (Level 2)

FACTORS	WHO FROM	AUDIENCE FIT	TONE	CONTACT	ROW TOTAL	LOCAL WEIGHTS	WEIGHTS IN %
WHO FROM	0.14	0.11	0.31	0.15	0.72	0.18	18
AUDIENCE FIT	0.28	0.21	0.27	0.19	0.93	0.23	23
TONE	0.02	0.04	0.05	0.08	0.20	0.05	5
CONTACT	0.56	0.64	0.37	0.58	2.14	0.54	54
TOTAL	1	1	1	1	3.99	1	100

Table 13. Normalized Score Tables for Alternatives of Content Criteria (Level 2)

FACTORS	RELEVANCE	SUBJECT	ALIGNMENT	ACTIONS	ROW TOTAL	LOCAL WEIGHTS	WEIGHTS IN %
RELEVANCE	0.43	0.33	0.37	0.5	1.64	0.40	40
SUBJECT	0.14	0.11	0.06	0.12	0.44	0.11	11
ALIGNMENT	0.21	0.33	0.19	0.13	0.86	0.22	22
ACTIONS	0.21	0.22	0.38	0.25	1.06	0.27	27
TOTAL	1	1	1	1	4	1	100

Table 14. Matrix for language criteria

A (Matrix)						LOCAL WEIGHTS (X)		AX (Matrix Product)	λ_{max}=AX/X (Matrix product/ Local weights)
FACTORS	**DIRECTNESS**	**PLAIN WORDS**	**READABILITY**	**GRAMMER**					
DIRECTNESS	1	2	3	2	*	0.42	=	1.83	4.36
PLAIN WORDS	0.5	1	0.5	2		0.20		0.80	4.11
READABILITY	0.33	2	1	2		0.25		1.05	4.24
GRAMMER	0.5	0.5	0.5	1		0.14		0.57	4.15

Table 15. Consistency Reliability for language criteria

FACTORS	DIRECTNESS	PLAIN WORDS	READABILITY	GRAMMER	ROW TOTAL	LOCAL WEIGHTS	WEIGHTS IN %
DIRECTNESS	0.43	0.36	0.6	0.29	1.68	0.41	41
PLAIN WORDS	0.21	0.18	0.1	0.29	0.78	0.20	20
READABILITY	0.14	0.36	0.2	0.28	0.99	0.25	25
GRAMMER	0.22	0.10	0.1	0.14	0.55	0.14	14
TOTAL	1	1	1	1	4	1	100

The AVG is the average of Matrix Prod/ Local Weight that is

AVG=(4.36+4.11+4.24+4.15)/6= 4.21

Consistency index, (CI) = (AVG-n)/(n-1) = (4.21416-4)/(4-1) = 0.07

Consistency Reliability, (CR) = CI/RI=0.07133/1.59= 0.079255556

In the similar manner the consistency index and consistency reliability is calculated for all the other factors or alternatives belonging to the other three criteria's and also for the four criteria's that are considered as per the table 15. The calculation revealed that the consistency for the design, relationship and content and criteria are .051, 0.079, 0.071, and 0.0793 respectively whose values were less than 0.1. Hence consistent.

The table 15 depicts the data's required to calculate the Consistency Reliability for language criteria. A refers to the matrix of the Language criteria. The local weights of language criteria are taken from the table 15. AX is the matrix product which is got by multiplying A (matrix) with the local weights (x) for language criteria. The $\lambda_{max}$is calculated by dividing AX with local weights. The AVG, consistency index and consistency reliability is calculated as mentioned above. In the same way, the consistency reliability is calculated for criteria's, and the alternatives or factors of design criteria, relationship criteria and content criteria in the same way as done for language criteria. After calculating, consistency index and reliability the next task is to calculate global weights. The global weights are calculated by multiplying the local weights of Level 1 and level 2. The same procedure is continued till all the global weights of the alternatives are calculated.

Table 16. Global weights and the local weights of criteria's

CRITERIA	LOCAL WEIGHTS	ALTERNATIVES	LOCAL WEIGHTS	GLOBAL WEIGHTS	%
CONTENT	0.60	RELEVANCE	0.40	0.2400	24.0
		SUBJECT	0.11	0.0660	6.60
		ALIGNMENT	0.22	0.1320	13.20
		ACTIONS	0.27	0.1620	16.20
LANGUAGE	0.08	DIRECTNESS	0.41	0.0328	3.28
		PLAIN WORDS	0.20	0.0160	1.60
		READABILITY	0.25	0.0200	2.0
		GRAMMER	0.14	0.0112	1.12
RELATIONSHIP	0.20	WHO FROM	0.18	0.0360	3.60
		AUDIENCE FIT	0.23	0.0460	4.60
		TONE	0.05	0.0100	1.00
		CONTACT	0.54	0.1080	10.80
DESIGN	0.12	GRAPHIC	0.42	0.0504	5.04
		LEGIBILITY	0.25	0.0300	3.00
		IMPRESSION	0.14	0.0168	1.68
		STRUCTURE	0.19	0.0228	2.28
TOTAL				1.0000	100

Table 16 shows the global weights and the local weights of criteria's (level 1) and alternatives (level 2). Table 17 shows the ranking of the alternatives that is used in developing the guide. Based on the ranking, those alternatives that have the highest ranking is made use in developing the self-learning guide to a largest extent.

The figure 2 shows the graphical representation of the global weights of all the alternatives in terms of percentage. From the figure, it is seen that the relevance has the highest percentage then the rest of the factors in terms of global weights. It is ranked as number 1 in the ranking of the factors amongst the other factors which directly tells us that the relevance factor is preferred the most amongst the rest of the sixteen factors. The tone alternative is the least preferred.

Table 17. Ranking of Alternatives

RANKING	ALTERNATIVES	GLOBAL WEIGHTS	%
1	RELEVENCE	0.2400	24.00
2	ACTIONS	0.1620	16.20
3	ALIGNMENT	0.1320	13.20
4	CONTACT	0.1080	10.80
5	SUBJECT	0.0660	6.60
6	GRAPHIC	0.0504	5.04
7	AUDIENCE FIT	0.0460	4.60
8	WHO FROM	0.0360	3.60
9	DIRECTNESS	0.0328	3.28
10	LEGIBILITY	0.0300	3.00
11	STRUCTURE	0.0228	2.28
12	READABILITY	0.0200	2.00
13	IMPRESSION	0.0168	1.68
14	PLAIN WORDS	0.0160	1.60
15	GRAMMER	0.0112	1.12
16	TONE	0.0100	1.00

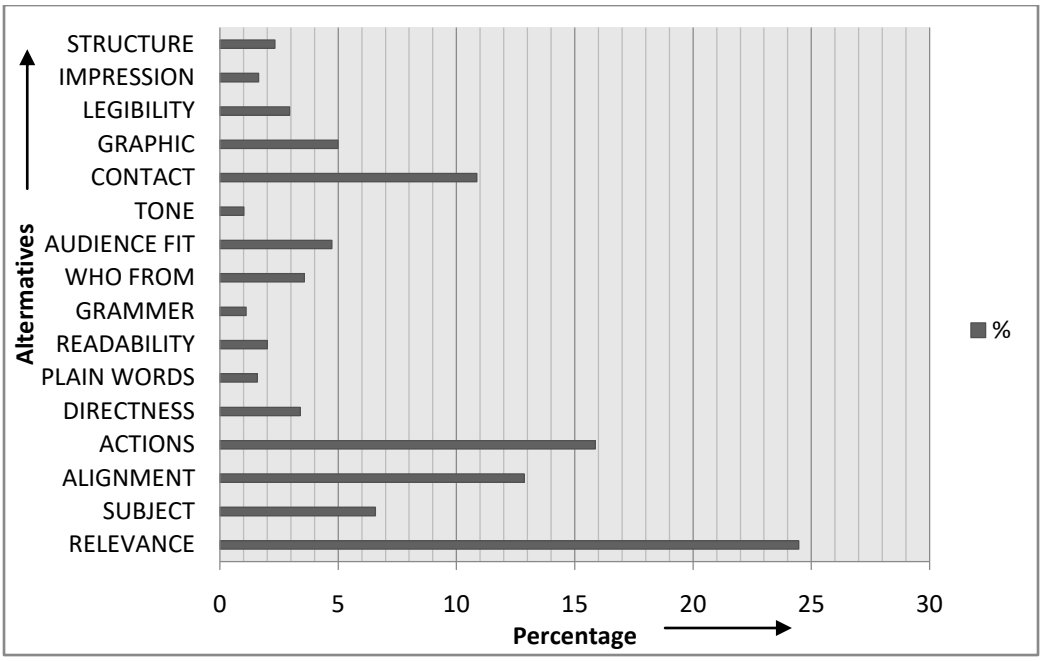

Figure 3. Graph showing alternatives and its global weight's in percentage (%)

FINDINGS AND INTERPRETATIONS

The AHP approach is used to rank the alternatives so that it enables to choose the factors which are used in developing the self-learning guide. This study is used to find the four important criteria's. They are language, content, relationship and design. The AHP analysis has revealed that content criteria was relatively important then rest of the criteria's such as Language, Relationship and Design. The relevance factor with global weight of 24.471 was found to be highly relevant and relatively important factor followed by action, alignment, contact and subject with 15.569, 12.858, 10.856, and 6.569 respectively. The alternatives that are considered to be least relatively important ones are the once like tone, impression, plain words etc. This meant to depict that the technical publication team which is going to use this self-learning guide needs a technical document which gives important to its content such that there is relevant information provided in the self-learning guide, clear and hassle free information while communicating the work process, clarity in action that is to be taken by the personal while carrying out the processes and the guide is to be developed in such a way that it depicts the organization's intended aims and values.

CONCLUSIONS

In this study an effort is made to identify the different factors that can be helpful in developing the self-learning guide using literature review as the main means of identifying the factors in order to facilitate smooth flow of information while carrying out the process in the technical publication department. There were sixteen factors grouped in to four criteria's were identify. The factors are relevance, actions, alignment, contact, subject, graphic, audience fit, who from, directness, legibility, structure, readability, impression, plain words, grammar and tone falling under four criteria's language, content, design and relationship.The prioritizing of these factors is done by the Analytical hierarchy process. The Analytical hierarchy process revealed that relevance factor was given the high priority than the rest of the factors. The relevance factor was followed by action, alignment, contact, subject as the immediate next high priority factors. The least priority factors are tone and impression.

From the present study it is seen that developing a technical document such as self-learning guide is qualitative in nature. The analytical hierarchy process is used for data analysis, but there are so many other processes that could be employed such as multi criteria decision making analysis to conduct the data analysis.

A self-learning guide is developed to meet the organizations requirements when the process are dynamic in nature, but the use of the self-learning guide is simply overlooked as the importance of having a self-learning guide are neglected as it is thought to be time consuming to develop. But in fact, the self-learning guide acts as an information centre by providing the accurate information when it is required the most. Not many studies have been conducted on the topics such as documents in the technical publication and the effect of using such documents such as self-learning guide. More studies can be conducted using the other factors to validate the effect of the self-learning guide.

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