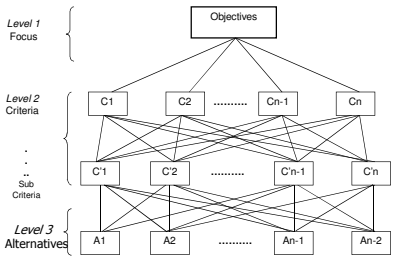
Giới thiệu AHP Decision making và ứng dụng

- Tuần 3
- Hai V. Pham

1

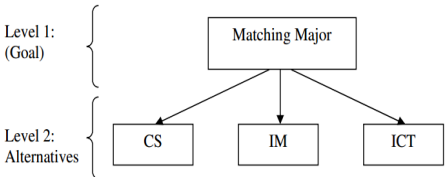
The overall model of Analytic Hierarchy Process (AHP) using TQM / ISO Factors

Structure model of the AHP hierarchy



2

Ví dụ: AHP



3

AHP Matrix

Major (M)	CS	IM	ICT
CS	1	2	4
IM	1/2	1	3
ICT	1/4	1/3	1

4

Tính toán ma trận AHP

Matching Major (M)	CS	IM	ICT	$\prod_{i=1..3}$	$B_i = \sqrt[n]{\prod_i}$ i=1..3; n=3	$P_i=B_i/B$ i=1..3
CS	1	2	4	8	2	0.56
IM	1/2	1	3	1.5	1.14	0.32
ICT	1/4	1/3	1	0.08	0.43	0.12
					3.57	

$\prod_i = CS \times IM \times ICT$

$B_i = \sqrt[n]{\prod_i}$

$B = \sum_{n}^{i=1} B_i$ ⇒ $P_i=B_i/B$

5

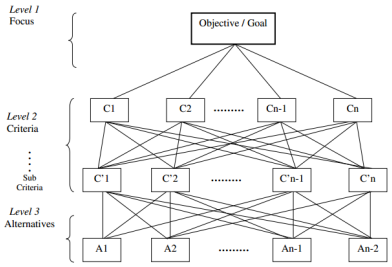
Thuật toán AHP – Decision Making

- Bước 1 – Đưa ra các vấn đề bài toán ra quyết định và xác định bộ tiêu chí theo theo cấu trúc AHP

6

Thuật toán AHP – Decision Making…

- Bước 2 – Thiết lập cấu trúc AHP theo bộ tiêu chí

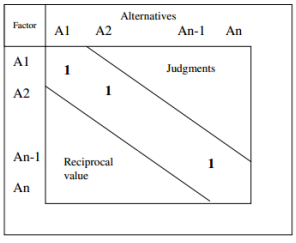


7

8

Thuật toán AHP – Decision Making…

- Bước 3 – Tạp lập ma trận so sánh AHP



AHP Scale xác định: 1-9 hoặc 1-7; 1-5 theo từng bài toán DSS

9

Thuật toán AHP – Decision Making…

- Bước 3 – Tạp lập ma trận so sánh AHP…

Comparison matrix A^f and Normalized Eigen Vector A_e^f

	F_1	F_2	F_3	…….	F_p	A_e^f
F_1	1	A_{12}^f	A_{13}^f	…….	A_{1p}^f	A_{e1}^f
F_2	A_{21}^f	1	A_{23}^f	……..	A_{2p}^f	A_{e2}^f
.	.	.	.	……..	.	.
.	.	.	.	……..	.	.
.	.	.	.	……..	.	.
F_p	A_{p1}^f	A_{p2}^f	A_{p3}^f	……..	1	A_{ep}^f

Remarks:

F_i means Factors (criteria)

A_{ij}^f means Pairwise comparison of ***jth*** colum's element to that of ***ith*** row's element.

A_{ei}^f means Normalized Eigen vector of ***ith*** row to get the estimate of vector of priorities

10

Thuật toán AHP – Decision Making…

Bước 4 – Tính toán ma trận AHP

$$Aw = \begin{array}{c} \\ A_1 \\ . \\ . \\ . \\ . \\ A_n \end{array} \begin{array}{c} A_1 \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad A_n \\ \begin{pmatrix} w_1/w_1 & \cdots\cdots\cdots\cdots & w_1/w_n \\ . & & . \\ . & & . \\ . & & . \\ . & & . \\ w_n/w_1 & \cdots\cdots\cdots\cdots & w_n/w_n \end{pmatrix} \end{array} \begin{pmatrix} w_1 \\ w_2 \\ . \\ . \\ . \\ w_n \end{pmatrix} = n \begin{pmatrix} w_1 \\ w_2 \\ . \\ . \\ . \\ w_n \end{pmatrix}$$

$Aw = \lambda_{max} w$

Tính toán CI:

$C.I. = (\lambda_{max} - n) / (n-1)$

Trong đó AHP Scale:

$C.R = C.I / RI$

n	1	2	3	4	5	6	7	8	9	10
RI	0.00	0.00	0.56	0.9	1.12	1.24	1.32	1.41	1.45	1.49

11

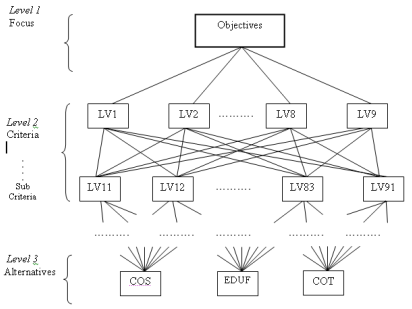
Thuật toán AHP – Decision Making…

Bước 4 – So sánh CR và tính toán mô hình phân cấp AHP

$C.R = C.I / RI$

12

Case Study - Ứng dụng thực tiễn - Analytic Hierarchy Process (AHP) using TQM Factors



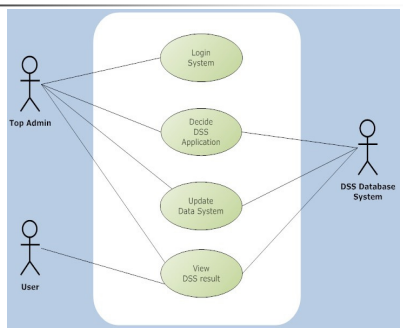
13

DSS / Group Decision Support Systems (GDSS) for VNU

No	Domain name	Training Quality and Quality Assurance of VNU	
	Decision Maker/ Group Decision Maker	Evaluation of the domain in specifications	
	DSS/GDSS identification	TQM Evaluation	ISO 9000 Appropriate Evaluation Model
	Top administration (Dean)		X
	Top Staff	X	
	Top Instructor	X	
	Alternatives	TQM evaluation for faculty / college of VNU ISO appropriate evaluation model of COE, VNU	

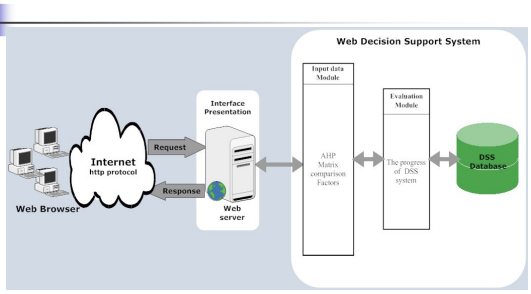
14

Use Case Diagram of Web-based DSS Application



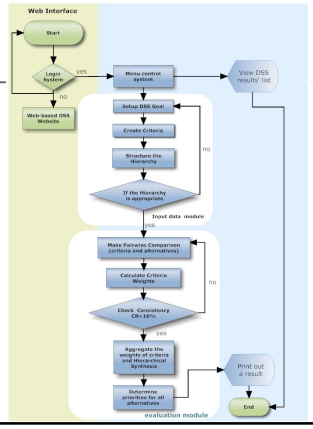
15

Architecture of Web-based DSS Application



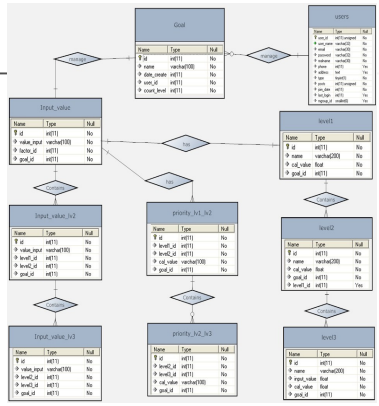
16

Prototype of the System



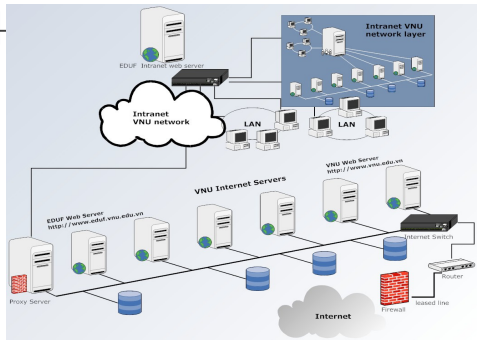
17

Entity Relationship Database model of the Web-based DSS application



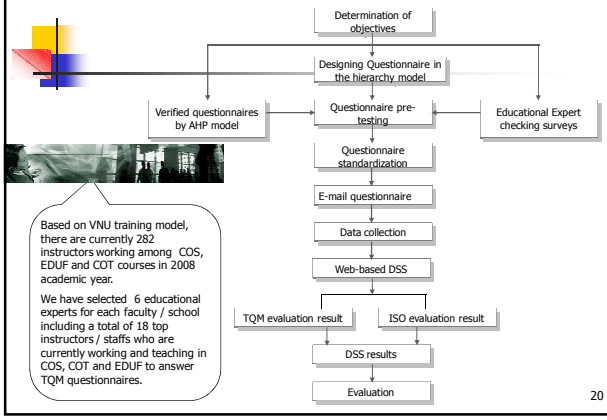
18

Web-based DSS implementation



19

Questionnaire Design and Data Collection Method

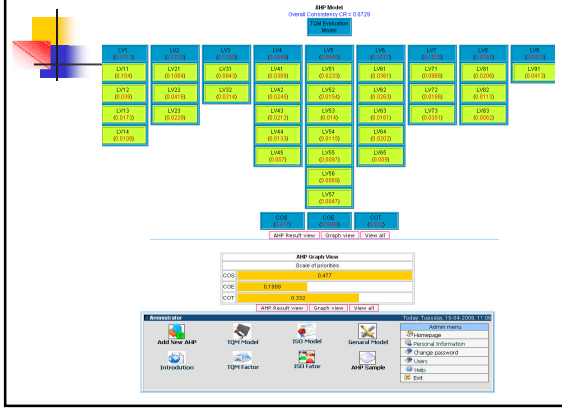


Based on VNU training model, there are currently 282 instructors working among COS, EDUF and COT courses in 2008 academic year.

We have selected 6 educational experts for each faculty / school including a total of 18 top instructors / staffs who are currently working and teaching in COS, COT and EDUF to answer TQM questionnaires.

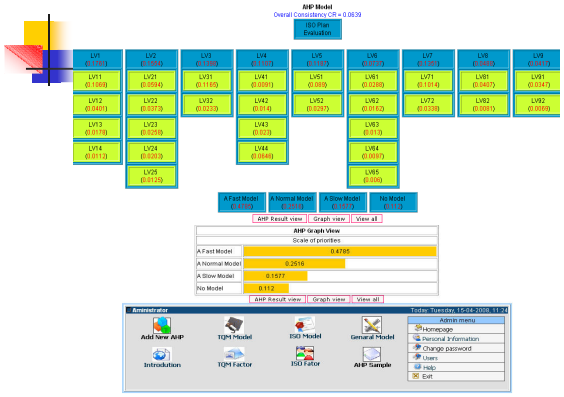
20

Results of AHP model using TQM factors



21

Results of AHP model using ISO 9000 factors



22