THE KNOWLEDGE MANAGEMENT FOR COLLABORATIVE LEARNING

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Procedure1: Teaching of the subject **"Data Bases"** by means of explanation

of a project process through a sample project.

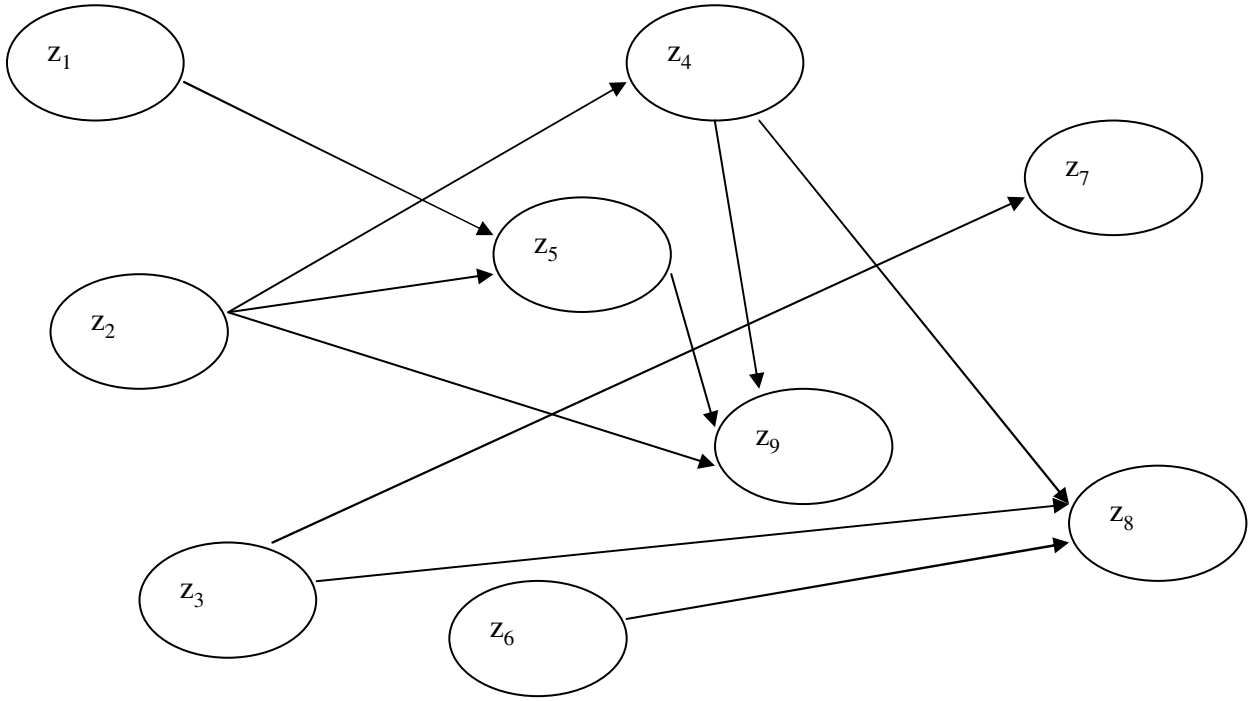
Table 1: The project tasks

The task Id	The name of project task
Z1	Data gathering
Z2	Composition of tables
Z3	Formation of list of the forms
Z4	Determination of list of queries
Z5	Formation of Data Base structure
Z6	Determination of demands from forms' structures
Z7	Formation of reports
Z8	Creation of forms
Z9	Creation of queries to Data Base

Graph of tasks dependencies

The temporal sequence of the task groups is

$F^*(\tau_1) = \{z_1, z_2, z_3\}$ $F^*(\tau_2) = \{z_4, z_5, z_6\}$ $F^*(\tau_3) = \{z_7, z_8, z_9\}$



The nomenclature of project-relevant knowledge:

$$k(p) = \{k_1, k_2, k_3, k_4, k_5, k_6, k_7, k_8, k_9, k_{10}, k_{11}, k_{12}\}$$

The task-relevant knowledge are

$k(z_1) = \{k_1, k_2\}$	$k(z_2) = \{k_3, k_4, k_7\}$	$k(z_3) = \{k_5, k_6, k_8\}$
$k(z_4) = \{k_5, k_8\}$	$k(z_5) = \{k_6, k_7, k_9\}$	$k(z_6) = \{k_1, k_4\}$
$k(z_7) = \{k_6, k_8)$	$k(z_8) = \{k_9, k_{11})$	$k(z_9) = \{k_{10}, k_{12}\}$

Table2. The sub - knowledge component weights

knowledge level(sub-components)	sub-component weight (importance)
know-what	5%
know-how	35%
know-why	45%
care-why	15%

Procedure 2: Determination of the personal knowledge of students before the start of the group project

$$k_0(s_1) = \{k_2, k_5, k_6, k_9\}$$
$$k_0(s_2) = \{k_1, k_3, k_7, k_{11}\}$$
$$k_0(s_3) = \{k_4, k_8, k_{10}, k_{12}\}$$

Procedure 3: Assigning of students for task execution

Table 3. The diversity between student knowledge and task-relevant knowledge

	$k(z_1)=\{k_1, k_2\}$	$k(z_2)=\{k_3, k_4, k_7\}$	$k(z_3)=\{k_5, k_6, k_8\}$
$k_0(s_1)=\{k_2, k_5, k_6, k_9\}$	4	7	3
$k_0(s_2)=\{k_1, k_3, k_7, k_{11}\}$	4	3	7
$k_0(s_3)=\{k_4, k_8, k_{10}, k_{12}\}$	6	5	5

Assigning of students for task execution:

$S_1 \rightarrow Z_2$ $S_2 \rightarrow Z_3$ $S_3 \rightarrow Z_1$

$S_1 \rightarrow Z_6$ $S_2 \rightarrow Z_4$ $S_3 \rightarrow Z_5$

$S_1 \rightarrow Z_9$ $S_2 \rightarrow Z_7$ $S_3 \rightarrow Z_8$

Procedure 4: Determination of the collaboration structure

The collaboration structure between the students s_1, s_2, s_3 assigned to perform the tasks z_1, z_2, z_3 is

$s_2(k_3, k_7), s_3(k_4) \rightarrow s_1$ $\quad$ $s_1(k_5, k_6), s_3(k_8) \rightarrow s_2$ $\quad$ $s_1(k_2), s_2(k_1) \rightarrow s_3$

The collaboration structure for task group $\{z_4, z_5, z_6\}$ is

$s_2(k_1), s_3(k_4) \rightarrow s_1$ $\quad$ $s_1(k_5), s_3(k_8) \rightarrow s_2$ $\quad$ $s_1(k_6, k_9), s_2(k_7) \rightarrow s_3$

The collaboration structure for task group $\{z_7, z_8, z_9\}$ is

$s_3(k_{10}, k_{12}) \rightarrow s_1$ $\quad$ $s_1(k_6), s_3(k_8) \rightarrow s_2$ $\quad$ $s_1(k_9), s_2(k_{11}) \rightarrow s_3$

Procedure 5: Determination of acquired knowledge by the students through collaboration while performing project tasks

$$k^*(s_1) = \{k_1, k_3, k_4, k_7, k_{10}, k_{12}\}$$

$$k^*(s_2) = \{k_5, k_6, k_8\}$$

$$k^*(s_3) = \{k_1, k_2, k_6, k_7, k_9, k_{11}\}$$

Procedure 6: Evaluation of quality of collaboration

Table 4. Knowledge sub-components with their weights acquired by student s_2

	Know-what	Know-how	Know-why	Care-why	∑
	0.05	0.15	0.35	0.45	
K_5			+		0.35
K_6				+	0.45
K_8	+		+		0.40

Quality of knowledge acquired by student s_2 by means collaboration is

$$q_{k(s2)}=(0.35 + 0.45+0.40)/3=1.2/3 =0.4= 40\%$$

Procedure 7: Evaluation of effectiveness of studying of a discipline by each student

Final personal knowledge is compared with

Subject-relevant knowledge

$k(p) = \{k_1, k_2, k_3, k_4, k_5, k_6, k_7, k_8, k_9, k_{10}, k_{11}, k_{12}\}$.

The final knowledge of the students s_1, s_2, s_3:

$k(s_1) = \{k_1, k_2, k_3, k_4, k_5, k_6, k_7, k_9, k_{10}, k_{12}\}$

$k(s_2) = \{k_1, k_3, k_5, k_6, k_7, k_8, k_{11}, k_{12}\}$

$k(s_3) = \{k_1, k_2, k_4, k_6, k_7, k_8, k_9, k_{10}, k_{11}, k_{12}\}$

As a result of comparison students have lack of knowledge:

$l(s_1) \rightarrow k_8, k_{11}$ $l(s_2) \rightarrow k_2, k_4, k_9, k_{10}$ $l(s_3) \rightarrow k_3, k_5$

Coefficient of efficiency for learning a subject by each student:

$r(s)=k(s)/k(p)$; $r(s_1)=10/12=0.83$; $r(s_2)=0.66$; $r(s_3)=0.83$