INSTITUTIONAL MECHANISM FOR ADAPTIVE TECHNOLOGY

Institutional mechanism of graduate education at Volgograd State University includes: formulating the aim and objectives, objects and subjects, methods and instruments as well as restrictions for the subjects' behavior, and preferences that they would like to realize (LEBEDEVA, 2002, 91-94).

1. The aim of the adaptive technology is formulation, development, modification and transformation of individual competence, giving students more decision making opportunities through a wider choice of methods for solving learning problems.
2. The objectives are achieved through the development of critical thinking and self instruction skills, creativity and application of ICT to the learning and research processes.
3. The objects of the adaptive technology are graduate students who are eager to make a successful career and who are responsible for their activities and experiencing the necessity of innovations.
4. The subjects of the graduate learning institutional mechanism are professors, lecturers, consultants, instructors and assistants.
5. The mechanism combines conventional discursive methods of teaching and learning (lectures, seminars and tutorials) and the so-called passive methods of learning (sets of texts, tests, assignments and glossaries) with advantages of the new delivery media, such as information audio, video, CD and DVD resources as well as online learning at interdistrict computer centers.
6. Restrictive rules of behavior include the terms of testing, doing written assignments and going in for individual exams.
7. Preferences that graduate students realize contain the development of their cognitiveness, ability to identify contradictions and make decisions in conditions of information asymmetry.

LIMITATION OF ADAPTIVE TECHNOLOGY USE

The use of the adaptive technology is restricted to graduate students' fields of activities, their cognitive abilities, motivations and task complexity, as well as to a lecturer's professional competence and methodological flexibility. The interaction between concrete graduate students and their lecturers and supervisors is a continuous process that forms a specific face-to-face and virtual learning environment.

The complexity of the realization of the institutional mechanism in the learning environment is caused by the contradictory relationship between the university management, faculty, students and staff. The main reasons of these contradictions are conservative thinking, the absence of normative base, the shortage of modern computer appliances, catering for collecting new knowledge but not for the development of professional competences.

For effective functioning of the technology it is necessary to support steady links and relationships between the university administrators and faculty. In Russia personification of relationships is very strong and very often there is no direct link between educational level and career growth. That's why with the formation and development of communicative, cognitive and other skills, the demand for appropriate corporative culture and social responsibility in universities is very high (BOGOLYUBOV, 2004, 18-19).

There is also a problem of accepting innovative ideas. Changes of stereotypes in educational methodology, workload redistribution for preparing teaching materials does not always correspond to lecturers' interests. As a rule this time consuming work is just the faculty initiative and responsibility.

The University management is trying to comply with the changing needs and interests of graduate students and faculty, but its plans are often restricted by the prescriptions of the Ministry of Higher Education and official regional educational authorities.

Nevertheless, the Graduate School faculty at Volgograd State believe that providing more training opportunities for employees is a strategically important task for the regional economy development. The use of the adaptive technology gives the opportunity to cushion some difficulties of the transitive period, when the need for new educational methods can't be fully met because of the shortage of necessary computer tools. In this situation the use of adaptive technology provides:

1) increase in graduate education enrollments and its quality enhancement;

2) individualization and intellectualization of educational methods;

3) interactive and cognitive nature of student activities;

4) individual approach to managing learning complexity and time.

CONCLUSION

The application of the adaptive technology to graduate studies in Russia reflects transitional processes in educational sphere. It combines traditional and innovative educational methods and promotes new educational approaches to meet the needs of graduate students and create opportunities for the solution of communicative, organizational, moral and other problems on the basis of professional universalism.

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The role of personality, gender and interaction in a cooperative and in a computer supported collaborative learning task

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Abstract

A total of 62 subjects of an Italian school, from the 4th and the 5th elementary school level (about 9, 10 and 11 years old), participated in a study investigating the effects of personality, gender and two cooperative learning tasks in children interactive behaviours. In our study we have considered two particular forms of cooperative learning: collaborative peer learning and computer supported collaborative peer learning. In the first task, children, working in pairs, had access to one computer. The independent variables were the personality (extrovert, introvert and mediovert), the gender of the couples (male, female and mixed couples), and the type of the task (hypertext and questionnaire), a repeated measure's factor. The dependent variables were the percentage of the time of the different interactive behaviours. Results have shown that personality clearly influence the way in which students interact when they work in pairs.

COOPERATIVE AND COMPUTER LEARNING

Cooperative learning is one of the most remarkable and fertile areas of theory, research, and practice in education. Cooperative learning exists when students work together to accomplish shared learning goals (Johnson & Johnson, 1999). Cooperative Learning refers to a set of instructional methods in which students are encouraged or required to work together on academic tasks (Slavin, 1987). Further, cooperative learning is not only a

subject of research and theory, but it is also used at some level by millions of teachers (Slavin, 1996). The use of Cooperative Learning leads the students to numerous positive effects on achievements (Dori & Herscovitz, 1999; Felder, 1995; Johnson et al., 1986; Johnson et al., 1990; Nichols, 1996; Potthast, 1999; Sisovic & Bojovic, 2001; Slavin, 1995; 1996), socials skills (Ashman & Gillies, 1997; Johnson et al., 1986; Nath & Ross, 2001; Ramsay et al., 2000) and motivation (Johnson et al., 1991; Nichols, 1996). Johnson et al., 1981 and Slavin 1983 considered a great deal of studies that compare cooperative learning with individualistic learning. They found that cooperative learning lead to a higher level of learning.

It is possible to divide cooperative learning methods into two: informal and formal cooperative learning. Formal cooperative learning is referred to a highly structured, long term, formal cooperative groups. Informal cooperative learning is referred to a less structured, short-term, informal cooperative groups (Cardellini & Felder, 1999; Klein & Schnackenberg, 2000; Johnson et al., 1996).

The issue of how collaborative learning supported by technology can enhance peer interaction and work in groups has attracted considerable attention in recent years. This area of research is referred as computer-supported collaborative learning (CSCL) (Lipponen at al., 2003). There is a body of empirical evidence indicating the benefits of CSCL in numerous aspects of learning (Cohen & Scardamalia, 1998; Hoadley & Linn, 2000; Lipponen, 2000; Lipponen et al., 2003). Even collaborative peer learning environments have received increasing attention in classrooms due to the potential in improving learning and achievement (Eilks, 2005). Yet previous research shows that not all students benefit from the collaborative experience (Webb & Mastergeorge, 2003).

THE RESEARCH

While there is a growing consensus among researchers about the positive effects of cooperative learning on student achievement as well as a rapidly growing number of educators using cooperative learning at all levels of schooling and in many subject areas, there is still a great deal of confusion and disagreement about *why* cooperative learning methods affect achievement and, even more importantly, *under what conditions* cooperative learning has these effects (Slavin, 1996). The aim of this study is to investigate if personality, gender and the type of the task can influence the way in which children interact when they work in pairs.

We focused our attention on interaction behaviours in two particular tasks: a computer supported collaborative peer learning and a peer cooperative learning task. In the first task, children had to learn, using a hypertext, how the little circulation of the blood works. Afterwards, in the second task, they had to fill in, together, a questionnaire about the topics of the hypertext. They were free to interact and to collaborate to complete the tasks.

In order to classify the interactions into different types, we have used a model suggested by Fonzi 1991 that provided for different interactive behaviours. The interaction can be successful or unsuccessful:

Successful interaction: a sequence of two related behaviours, one acted by a member and one acted by the other member of the couple. This sequence includes a question and an answer.

Unsuccessful interaction: a question or an action, made by a member of the couple, that do not have answer by the other member.

The purpose of the interaction can be collaborative or competitive:

Collaborative interaction: the aim of the action is to collaborate to solve the common topic.

Competitive interaction: the aim of the action is to obstruct the work of the other member.

We compare the different interactive behaviours that the pairs have shown in the tasks (hypertext and questionnaire) with both personality and gender in order to understand if type of the task, personality and gender can influence peer interactive behaviours. The dependent variable was the percentage of time of the different interactive behaviours.

DESIGN OF THE STUDY

The present study took place in a suburban elementary school district in the city of Cagliari (in the Sardinia region). The study involved 62 children (35 male and 27 female) of an Italian, elementary school of which 30 children belonged to the 4th grade and 32 belonged to the 5th grade. The average age of the subjects was 10 years and one month, with a standard deviation of ± 9 months. The students were novices in using educational technologies. Some of them were not beginners in using computers. IQ was assessed (in order to leave out from the research children with particular problems) with the WISC-R (Wechsler, 1997). The students' personality were identified based upon their scores in the Energy dimension on the BFQ-C (Barbaranelli et al., 1998). In order to couple the children, we considered the personality and the gender factor. Furthermore, the experimental design has provided a repeated measure's factor: the type of the task. The considered independent variables were:

The personality factor: through the use of BFQ-C it was possible to classify children's personality as: introvert, mediovert and extrovert. Children were coupled in order to form couples of extrovert, couples of mediovert, and couples of introvert.

The gender factor: children were coupled in order to form couples of males, females or mixed couples.

The repeated measure factor task: all the couples had to deal with a learning task, using an hypertext together, and with a traditional task, the fill-in of a questionnaire.

After the subdivision, 31 couples were obtained. The different factors were balanced in order to have almost the same representation of all the types. The experimental situation, as said, included two phases in which students worked in pairs. In the first, children had to deal with a hypermedia, in order to understand how the little circulation of the blood works. In the second task children had to compile a questionnaire pertinent to the subjects presented in the hypertext.

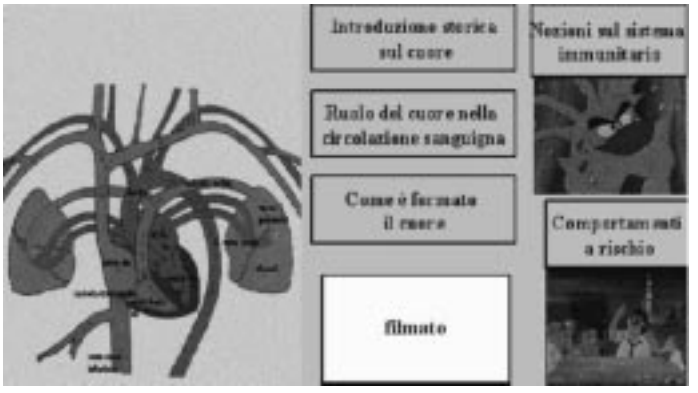

Figure1: The hypertext (Italian version) for the science task.

The instrument used in the first task was a hypertext, more precisely an hypermedia. The science topic was the little circulation of the blood. The hypermedia was structured as follow: in the left part of the screen was presented a figure of a heart with the principal veins and the links to the lungs (the figure was enriched with the names of the parts, for ex. right auricle, aortic valve, tricuspid valve). In the right part, there were five clickable words: immune system, historical introduction of the heart, how the heart is structured, dangerous behaviours, the role of the heart with the circulation of the blood. The hypertext presented the information in a casual way, so the children have the opportunity to choose what to see for their own.

Moving the mouse in the screen, children discovered that there are clickable areas. If they click in those areas they had the possibility to watch a film about the chosen arguments. The hypertext, totally includes 16 arguments that permit to understand how the heart works: historical introduction about the heart, role of the heart with the circulation of the blood, vena cava inferior, how the heart is formed; right atrium, tricuspid valve, right ventricle, pulmonary artery, immunitary system, the way to the lungs, risk behaviours, pulmonary alveolus, pulmonary vein, left atrium, left ventricle and aorta.

Children have no limits of time to browse the hypermedia. The pairs cannot only choose, but they can dwell upon the argument and see it again. Children can consider at the same time: the figure of the heart, the short film and the voice recorded. The instrument used for the second task is a questionnaire. It was presented in a 14 item's version for the 4th grade and in a 20 item's version for the 5th grade children. The difficulties for younger children in longer questions makes this distinction necessary. Conte & Meloni, 2002 demonstrated that there is not significant differences between the two versions of the questionnaire, adapted according to the scholastic level of the sample. The two tools are therefore equivalent. Each couple had only one copy of the questionnaire. They were free to talk, interact and decide together the right answer. For each question, there were 5 alternatives:

3 wrong answers, 1 distractor (an answer with one or more wrong words), 1 correct answer.

THE METHOD

After the authorizations from the parents of the children were obtained, the WISC-R was administered to assess the IQ of the children. The average IQ was 107 with a standard deviation of ± 11. Couples are created by children of the same class (4^{th} or 5^{th} grade level). The informal cooperative learning couples were formed after considering IQ, class level, personality and gender. Particularly, 10 couples of extrovert children, 10 couples of mediovert and 11 couples of introvert children were formed. Children had to have a similar level of IQ and had to belong to the same class level.

The procedure utilized in the first task was the following: 4 couples a day were assessed, from 9.00 am to 1.00 pm. Before the children started using the hypermedia, they were told how to deal with it. The mouse was given to them, in order to understand how to use it. They were told to be in agreement in what to see and to pay attention because they will have to compile a questionnaire after this task.

After the first task, the couple received only one questionnaire and only one pen. They were told to work together. There was no limit of time to complete it. The two phases were videotaped in order to identify and classify the patterns of interaction and participation of children in the two different conditions. Using Fonzi's model, we were able to divide interactions in:

– Successful cooperative interactions.
– Successful competitive interactions.
– Unsuccessful cooperative interactions.
– Unsuccessful competitive interactions.

The interactive behaviours were related to one of the four categories. The considered dependent variables were the percentage of time of interaction behaviours of the four categories. At the end of the tasks, it was possible to analyze and classify the interactions. The following information were consecutively reported in a table:

– personality of the coupled children
– gender
– total time employed to complete the tasks
– time of total interactions
– time of each of the four interactive's behaviours
– percentage of time for each of the four interactive behaviours.

Observation of the interactions. The children were free to interact, for all the time they need to complete the tasks. The different interactions have a different meaning if the opening behaviour was followed by a response's behaviour by the other child. For example: A child asking for information to the other child who answers. (Successful cooperative interaction). A child asking for information to the other child who doesn't answer. (Unsuccessful cooperative interaction). A child tries to bring the mouse to the other child who resists. (Successful competitive interaction). A child takes the questionnaire so the other can't see it. The second child doesn't answer. (Unsuccessful competitive interaction). Appendix A shows a sample of the tables used to classify the interactions.

DATA ANALYSIS

With the data obtained three different ANOVA were conducted. The independent factors were:

– the first factor was the personality (introversion, medioversion, extroversion).

– the second factor was the gender of the couple (male, female, mixed couple).

– the third factor was the experimental task (hypertext or questionnaire).

In the first analysis the dependent variable was the percentage of successful cooperative interaction behaviour's time. In the second analysis the dependent variable was the percentage of unsuccessful cooperative interaction behaviour's time. In the third analysis the dependent variable was the percentage of successful competitive interaction behaviour's time. To compare the means the Duncan's test was used.

RESULTS

1. Analysis of the successful collaborative interaction's time. From the first analysis it is possible to observe that the personality factor is significant ($F=9.71$; $df=2/22$; $p<0.01$); the gender factor is not significant ($F=0.73$; $df=2/22$; $p>0.05$; male mean 76.49; female 81.55; mixed couples 75.51); the third repeated measure factor (hypertext-questionnaire) is significant ($F=8.49$; $df=1/22$; $p<0.01$). It was significant the interaction between the personality of couples and hypertext-questionnaire factor ($F=3.87$; $df=2/22$; $p<0.05$). No other interactions were significant ($p>0.05$)

Personality	Type of the task	Means	Difference	p-value
1 (extrovert)	1 (hypertext) 2 (questionnaire)	89.49 90.36	-0.87	.78271
3 (mediovert)	1 (hypertext) 2 (questionnaire)	74.30 78.07	-3.77	.26686
2 (introvert)	1 (hypertext) 2 (questionnaire)	60.44 74.44	-14.00	.00031*

Table 1. Analysis of the successful collaborative interaction's time. The asterisk indicates the means that significantly differ.

From the data we can observe how the percentage of successful cooperative interaction's time are significantly higher ($p<0.01$) for extrovert couples. Percentages of successful cooperative interaction's time are significantly higher in mediovert than in introvert couples ($p<0.05$). There are not significative differences between hypertext and questionnaire conditions. Introvert couples presented a percentage of successful cooperative interaction's time significantly lower than the other two groups ($p<0.01$) during the hypertext condition.

2. Analysis of the unsuccessful cooperative interaction's time. From the second analysis is possible to observe the personality independent factor is significant ($F=6.52$; $df=2/22$; $p<0.01$); the gender independent factor is not significant ($F=0.31$; $df=2/22$; $p>0.05$; male, mean 9.71; female, 6.57; mixed, 9.07); the "hypertext-test" repeated measures factor is significant ($F=7.40$; $df=1/22$; $p<0.01$). It is significant the interaction between personality of couple's factor and "hypertext-test" factor ($F=4.57$; $df=2/22$; $p<0.05$). The other interactions are not significant ($p>0.05$).

Personality	Type of the task	Means	Difference	p-value
1 (extrovert)	1 (hypertext) 2 (questionnaire)	1.80 2.00	-0.20	.95376
3 (mediovert)	1 (hypertext) 2 (questionnaire)	9.80 6.06	3.74	.32454
2 (introvert)	1 (hypertext) 2 (questionnaire)	23.50 7.54	15.96	.00027*

Table 2. Analysis of the unsuccessful cooperative interaction's time. The asterisk indicates the means that significantly differ.

From the data we can observe that introvert couples, in the hypertext condition show a percentage of unsuccessful cooperative interaction time significantly higher than introvert couples in the questionnaire condition ($p<0.01$). There is a tendency to a lower unsuccessful cooperative interaction's time in mediovert and extrovert couples.

3. Analysis of the successful competitive interaction's time. In the third analysis is possible to observe as personality independent factor is significant ($F=5.96$; $df=2/22$; $p<0.01$). The gender factor is not significant ($F=0.98$; $df=2/22$; $p>0.05$; male, mean 13.54; female, 11.24; mixed, 14.87). The repeated measures "hypertext-test" factor is not significant ($F=0.04$; $df=1/22$; $p<0.05$; successful competitive interaction during hypertext, mean 13.44; during questionnaire, mean 13.00). The interaction between the personality and the gender of the couple's factor is significant ($F=4.35$; $df= 4/22$; $p<0.01$). Other interactions are not significant ($p>0.05$).

Personality	Gender 1	Gender 2	Mean 1	Mean 2	Difference	p-value
1 extrovert	male	female	8.66	6.75	1.91	.68628
	female	mixed	6.75	8.77	-2.02	.67860
	mixed	male	8.77	8.66	0.11	.97946
3 mediovert	male	female	12.06	8.43	3.63	.45868
	female	mixed	8.43	23.46	15.02	.00612*
	mixed	male	23.46	12.06	11.4	.02762*
2 introvert	male	female	19.92	18.55	1.37	.75780
	female	mixed	18.55	12.37	6.18	.17423
	mixed	male	12.37	19.92	-7.55	.11766

Table 3. Analysis of the successful competitive interaction's time. The asterisk indicates the means that significantly differ.

From the data we can observe that extrovert couples show a significantly lower percentage of successful competitive interaction's time ($p<0.05$) than the other couples (means: extrovert: 8.06; mediovert: 14.65; introvert: 16.94). The introvert couples show a significantly higher percentage of successful competitive interaction's time than the other couples ($p<0.01$). For extrovert and introvert couples no differences are shown for the gender; medioverts male and female have no differences, while mixed couples show a percentage of successful competitive interaction's time significantly higher ($p<0.01$) than the other couples.

DISCUSSION

Results show that personality evidently influences the interactive behaviours of the couples. For example, it is possible to observe that extrovert couples show a significantly higher percentage of successful collaborative interactions' time than mediovert and introvert couples. Introvert couples show a lower period of that interaction than the other couples. It is possible to observe an higher percentage of interactions' time during the questionnaire than during the hypertext situation. Results about unsuccessful cooperative interaction, demonstrate that introvert couples show a percentage of interactions' time significantly higher than the other couples. There is a tendency of a lower percentage of unsuccessful collaborative interactions in extrovert than in mediovert couples.

Extrovert couples show a lower percentage of successful competitive interactions' time than the other couples. Vice versa, introvert couples show a higher percentage of successful cooperative interactions' time than the other couples. We can conclude that extrovert children are more capable in making collaborations in a problem solving task. Introvert children have more difficulties in building relations and in collaborative behaviours than the other couples.

CONCLUSIONS

Cooperative learning is very useful in increasing all the learning outcomes. Many authors agree that cooperative learning leads to increasing achievements, social skills, self-esteem, respect of the diversity, and reciprocity. Although the positive effects of the use of cooperative learning are clearly demonstrated, the researchers feel it is necessary to deepen their knowledge about the conditions that made cooperative learning be so positive.

The aim of this research was to investigate the particular effect that personality and gender could have in children working in coupled interactions. If children are able to positively interact, it is probable that they can learn more. Results show that personality influences the way in which children work in couples. Introverts face more difficulties in dealing with cooperative learning tasks, as it is shown by the lower percentage of successful cooperative interactions. A future goal could be to find the conditions to allow everybody to overcome the difficulties they bump against, and permit them to utilize cooperative learning resources in the best way possible.

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Appendix A. Classification of the interactions between the children during the tasks: an example.

Number of the couple :……15……..
Gender of the children: ☐ males ☐ females ☐ mixed couple
Personality of the children: ☐ extroverts ☐ mediovert ☐ introvert

Interactions during the hypertext phase
Length of the task: ..1201 sec**…….**
Total length of interactions:….330 sec**…...**
Length of successful cooperative interactions……212 sec**…….. percentage** ……64,24 %**……**
Length of unsuccessful cooperative interactions……94 sec**……... percentage**..... 28,48%**.....**
Length of successful competitive interactions…….24 sec**……. percentage**…….7,27%**……**
Length of unsuccessful competitive interactions……0 sec**……. percentage**……..0%**…….**

Description of the interaction	Length of the interaction (in seconds)	Type of the interaction
A child asking for information to the other child who answers	*15 seconds*	*Successful cooperative interaction*
A child asking for information to the other child who doesn't answer.	*11 seconds*	*Unsuccessful cooperative interaction*
A child tries to bring the mouse to the other child who resists.	*8 seconds*	*Successful competitive interaction*
The children speak together about the hypertext	*14 seconds*	*Successful cooperative interaction*
A child asking for information to the other children who answer	*21 seconds*	*Successful cooperative interaction*
A child tries to bring the mouse to the other child who resists	*5 seconds*	*Successful competitive interaction*
The children look at the hypertext, they are speaking about it	*16 seconds*	*Successful cooperative interaction*
A child asking for information to the other child who doesn't answer.	*21 seconds*	*Unsuccessful cooperative interaction*
A child tries to bring the mouse to the other child who resists.	*4 seconds*	*Successful competitive interaction*
The children speak together about the hypertext	*17 seconds*	*Successful cooperative interaction*
A child asking for information to the other children who answer	*19 seconds*	*Successful cooperative interaction*
A child asking for the mouse to the other child who gives it	*5 seconds*	*Successful cooperative interaction*
…….	…….	…….

Interactions during the questionnaire phase
Length of the task: ..1425 sec**…**
Total length of interactions:…...…524 sec**…….**
Length of successful cooperative interactions……358 sec**…. percentage …….**68,32%**……**
Length of unsuccessful cooperative interactions……115 sec**.... percentage**.....21,95%**.....**
Length of successful competitive interactions……51 sec**... percentage**……9,73%**……**
Length of unsuccessful competitive interactions……3 sec**…. percentage**……..0,57%**.....**

A child takes the questionnaire so the other can't see it. The second child doesn't answer.	*5 seconds*	*Unsuccessful competitive interaction*
Children read together the questionnaire and answer to the questions	*14 seconds*	*Successful cooperative interaction*
A child asking for information to the other child who is loafing	*13 seconds*	*Unsuccessful cooperative interaction*
A child asking for the pen to the other child who gives it	*8 seconds*	*Successful cooperative interaction*
Children read together to the questions	*14 seconds*	*Successful cooperative interaction*
A child takes the questionnaire so the other can't see it. The second child doesn't answer.	*10 seconds*	*Unsuccessful competitive interaction*
A child asking for the pen to the other child who gives it	*12 seconds*	*Successful cooperative interaction*
Children read together the questionnaire and answer to the questions	*13 seconds*	*Successful cooperative interaction*
Children read together the questionnaire and answer to the questions	*18 seconds*	*Successful cooperative interaction*
…….	…….	…….

Interactions during the two tasks
Total length of the two tasks: ..2626 sec**…** **Total length of interactions:…...**. 854 sec**…….**
Length of successful cooperative interactions……570 sec**…. percentage ……**66,74 %**……**
Length of unsuccessful cooperative interactions……..209 sec**... percentage**..... 24,47%**.....**
Length of successful competitive interactions……75 sec**…. percentage**……..8,78%**……**
Length of unsuccessful competitive interactions……3 sec**…… percentage**……0,35%**……..**

Rating university faculty performance using analytic hierarchy process

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Abstract:

The purpose of this paper is to outline a framework which can be used to evaluate candidates for a faculty position. The methodology employed is based on the Analytic Hierarchy Process (Saaty,1982). This method permits the introduction of individual parameters to resolve the conflict that normally arises when incompatible criteria underlay the selection process. Because of the large number of factors involved in the model, the overall problem is decomposed into three sub-problems individually focusing on research results, educational ability and social contribution respectively. The results from each are then combined to yield the final ranking. To demonstrate the methodology, an example is developed based on the ranking of three candidates with different achievements. Computational results are presented along with their implications.

INTRODUCTION

One of the most important issues facing organisations like universities is the identification and selection of candinates who will be used as teaching and research staff. Attracting highly qualified staff has become an important issue (Flynn 1994; Chambers et al., 1998; Cappelli 2000). Private as well as public employers complain about the difficulties to select qualified employees (Gilot et al., 2002). One type of information, which has typically been used to make this selection, is the academic achievements of the applicants during their previous academic positions. A major problem with this information i.e. publications, educational ability, services to society etc. is that it can be measured variously, and that generally, applicants do not present a normal distribution of achievements in all that criteria which are usually characterized by a large number of interactive factors. Because of such limitations, in most cases, seems inadequate to make objective decisions and often decisions based on subjective knowledge or a complete logical resolution of the applicants if that ever is a possibility.

A review of the research literature indicates that has attracted limited attention to the staffing problem of universities. Although a number of studies have investigated the productivity (Cheng, 1984), administration (Newcomb, 1982), job performance (Dalessio, 1986), release time (Souder, 1981), barriers (Liker, 1986), and others (Davinson, 1983), (Pappas, 1985) no attempt have been made to measure academic qualifications.