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**ORDERING AND REALIZING THE EFFECTIVE FACTORS ON
LEARNING AMONG STUDENTS THROUGH NEURAL NETWORKS
APPROACH, A CASE STUDY: THE SENIOR HIGH SCHOOLS IN
NORTH OF IRAN**

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ABSTRACT

The objective of the present study has been to realize and ordering the effective factors on students' learning process. The research was a high rank one and the picked pool consists of all students (male & female) studying at senior high schools, North of Iran during academic year 2014-2015. There were picked 240 students up through multi-step cluster sampling, using Cochran formula. A researcher made questionnaire was utilized to collect information ($\alpha=0.86$), to analyze the data, there were used neuron networks. In accordance with Neural networks approach, firstly it occurred a concord on several factors like: learner, family, teacher, educational system, education environment and society. Interferential analysis through neural networks showed that the educational system is the most effective factor of all in students' learning.

Keywords: *Learning; Neuron Networks; Educational Environment; Learners (Students)*

INTRODUCTION

Definitely, learning is the most important mental phenomenon in human being and other evolved creatures. Therefore, it can be the reason to differentiate man mentally from other creatures as well as his own rapport. Psychology of learning is one of vital debates in psychology which has gained vast area of research by experts, along with different theories announced about it. The importance and value of learning would be revealed when one deprives from all he has learned, consequently a man would physically be mature, however mentally back to childhood period (Orion, 1994). Having teaching and learning in concord with other social needs in the future can be helpful, it means, the schools must be active in consecutive learning. To advocate and promote it, there should be used appropriate learning strategies in which the learners share to adjust them. Therefore, learning is a process in which the learner accesses enough information in subject and content scope, to gain this aim, a teacher could organize learning tasks and technical structure to support his student (Adesiyun, 1989). In all kinds of artificial intelligence, a data base can be the basic determiner in factor behavior. However it perhaps could be insufficient the periodical capabilities of the database to show considered efficiency. The occurred change in database is learning. In most cases, the favorite modification is unpredictable; therefore, the environment is indicator. The favorite capability is that the smart factor could improve the database in accordance with samples received through environment (and changes in it). According to engineering, the process of learning is described: adjusting the free parameters in a system so that it could have the best environmental simulators (input-output). Learning is a process in which a system (neural networks) modifies its free parameter to have the best environmental simulators. In neural networks, the free elements in a system, which are determiner in data nature and its saving, are the communicative weights between processor units. So, the learning process is the modification of weights during passing time (Gheshlaghi, 2008). Recognizing the effective factors on learning is the objective of all learning theories pronounced by educational system founders. Here it can be introduced a vast inventory of factors which have learners learn better, although finding the best integration of them would warrantee the personal learning quality which is the main point here. In an educational system, several factors are involved in students learning and educational promotion. Each part of the system can help to gain a suitable and

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favorite outcome, since if any tiny part stops working; the efficiency of the other parts would be reduced and hurt. Amongst the effective factors on students' learning are: teacher, learner, family, educational environment, society and educational system. It has not been any previous study about neurotic networks in education ground, however many more researches have been already done on neurotic networks in other areas of study and students learning as well. Noticing this fact that there has not been any study in Neuron Nets in education, also whereas learning among students is important, in this paper we tried to order and realize the effective factors in learning process. In this study the effective factors in students learning were realized and ordered through utilizing artificial Neural Nets.

Statement of the Problem

The most part of previous studies about learning were done by behaviorists, they mainly believed that: some simple relationships such as conditioning would make any kinds of learning basis and foundation (Keith, 2008). The most serious process in scientific study of learning was using animals in experiments about learning. Edward L. Serendice, was a pioneer at doing experiments on perceiving animal learnings. Perhaps the oldest thought about learning could be the one about Mental Approaches Association. According to this assumption, learning appears at the time when the tune of a melody simultaneously joints the tune of its singer, which through this process we can recognize and remember its singer (Bill, 2006).

The learning concept can be defined as follows:

Learning can be a consecutive change in behavior which comes out of rehearsal. However the behavioral changes out of being mature or undertaken by the temporary change in an organism's condition or situation (such as fatigue or mood results from drug usage) cannot be accounted (Etinkson *et al.*, translated by Rafiee, 2004). According to it, then, learning is a change in human ability which lasts for a while so that it cannot be simply referred to growth process (Ganiyeh, translated by Najafizand, 2004). The most well-known of these definitions has been announced by Kimble: "a relatively constant modification in behavioral ability (potential behavior) which is boosted through rehearsal" (Diana, 2009). Definitely, it can be said that the importance of learning in man growth and development is far more than his outlook. Recently, the psychologists found out the grandeur of human emergence, even in the early ages, they also noticed that the main factor in it is learning. They, moreover, believe that any behavior in human roots in learning, it means a series of simple learnings goes to more complex ones. Furthermore, since the environment of living is changing continuously, to overcome all these alterations, man needs to learn.

Significance of Learning

Life of every alive creature, especially human being relates to learning since he needs a special behavior for any moment of his lifelong which without it, there cannot, absolutely, occur improvement, therefore any human being must learn this sort of behavior or change the previous one. Finding new habits and transforming how to behave would be possible through learning. Consequently, everybody's success and achievement depend on his/her talent in learning. Learning is an effective and essential factor of completion during life, especially mental, emotional and social growth which needs more of learning than other kinds of factors in growth. Any creature would try to conserve and continue its life in accordance with its intrinsic conduction. One of the best instruments to do it is learning, since everybody learns through environment how to live, in other words, learning ability makes one realign or evolve their behaviors. Learning talent connects the present to the future, without learning activity, human society will lose his civilization, so learning ability is the base of new civilization, therefore if anyone who wants to be and reserved as civilized, must take part some duties which in turn they need some learning abilities. Being compatible to outer space depends on learning amount. It means more learning talent, more use of it and more compatible to the environment which means access to things which are necessary to gain aim. Living and learning are two interfered actions without being separated. Not only learning makes the foundation of anybody's life, but also makes the base in social life, because through this ability, the people in a society could learn social customs to follow them. Learning talent can connect one and society emotionally with mutual agreement, therefore one can learn how to interpret his/her emotions or even

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how to do it toward others' emotions. More than what was said, the cornerstone of education depends on learning talent which through it a child can learn how to feed, walk, put on clothes, talk, fulfill his/her needs, desires and how to interpret his/her feelings and thoughts. Actually, when a baby comes to birth, he has no talent except learning to live, since through it s/he can use body organs and natural powers inside (Importance of Learning, 1983). Contrary to past when it was assumed that one's learning ability relates to his/her talents and intelligent, recently psychologists boost this opinion that however some intrinsic factors such as talent and intelligent are determiners in learning process, but some non-intrinsic also are important as well which are teacher, learner, family, educational environment, society and education system. When parents are in touch with school authorities, helps to better recognition of students' merits and demerits, therefore more help could be offered to a student. Having parents in meetings attended by them and authorities as well as teachers shows that parents are concerned to their kids' education status, success and finally the kid him/herself. Children expect their parents to help them to remove their problems and fulfill their needs as well by promoting their knowledge level (Ahmadvand, 1991). Education spaces are susceptible to be rigid and tough for their limitations, however all tries must go on to prevent occurring it. Giving priority to education spaces and following the rules and standards related in designing them leads to making an environment correspondent to students' mental intentions and society's as well. Every student's interest roots in learning at school and being in such a place, however if the environment is not in accompany with one's expectations, it will appear lack of interest and repellent feeling. Class appearance and setting, color, light and ventilation, education facilities, internal decoration and so on are effective in learning and making students interested in learning (Farahniya, 2011). Although it can be claimed that the best class has the environment in which students mostly look like guests to be warmly welcomed and the teacher is the host. The education environment must be chosen in such a way to have student's eager enough in contrast to other environments. In recent century, these sorts of issues must be basically considered not just passing through them. Of course, it needs more attention through education authorities since our education issues as well as its spaces must cover a long distance to reach the favorite standards (Tajbakhsh, 2010). Education vocation is to have everybody able to improve completely ones talents and abilities, so using correctly reforming politics far from the two extremes or being biased blindly can bring positive revolutions in education system. Therefore, attempts done in education reforming, to make coordination and compatibility among different education levels would go to successful results (Amouzgar, 2005). Reviewing the education issues needs planning as a skill, allocating financial, humanitarian and body resources, therefore to make any alteration in above mentioned issues, there must be qualitative and interfiled educational researches. Moreover, to draft a desirable state, there should be considered a wide landscape to picture a more subtle perspective toward future. In reviewing and planning to establish quality in education, the physical conditions of education environment alongside other factors could be effective and efficient (Moeinpour, 2006). In traditional teaching in which learning regarded as getting information by learners, teacher shows an essential role during teaching process." In this role, the initially a teacher aims to inform learner through direct teaching, it means giving lecture which supported mostly by textbooks" (Wiggins and McTighe, 2012). On the other part, however in pioneer education system, students are mainly responsible to learn during teaching process, therefore the role of the learner is important during learning process (Harden and Crosby, 2000), they also say:" we consider teacher as information producer and learning facilitator who encourages students to take responsibility in gaining information, so a teacher just helps to the learner in this process". Nowadays, the roles of teachers are not only to transfer scientific facts during teaching process, but providing desirable learning situations, how to think and learn to their students. If they could teach students how to learn, then they would learn by themselves. To learn, students need to think autonomously. Having student think is the main job for teachers, so an efficient teacher is the one who makes learners encounter the problems, and then helps them to think on their own to remove them. Makher (1989) notified that one of the most immediate duties of a teacher is to help students to learn scientific contents, also emphasizing this fact that teaching is going to make students be able to how to learn knowledge. Although, in modern school context, more attention gives to student self-learning rather

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than how to learn. Being in school status means to improve yourself alongside teachers, competing peers and finding solutions to problems occurred by the help of parents to show that one wants to be a student and encounter unscientific aspects of school life.

Neural Networks

The artificial neural networks are a simplified model of a central system which patterns human brain structure. It also utilizes intra-neurons complex computation to bring reflections toward changes in accordance with data medium. The artificial neural networks can process the in situ data, knowledge or potential rules to transfer them into net structure, so having the digital data computations or according to examples; it is able to learn general rules.

One of the most vital features of neural networks is the ability to learn, it means it can adjust Net parameters during time in different situations to have the network reserve its efficiency in a special state, despite tiny modifications in peripheral conditions. When the net gets enough trained to encounter a new entry, it can use interpolation and a suitable output as well. In other words, the network can learn algorithm in accordance with training then find an appropriate analytical relationship for a number of spots in space.

The artificial neural networks, however are not comparable to a natural neurotic system, but it is unique in pattern recognition, Robotic, Modelling, Control, classification, identify, Forecast, Technical, Fiscal, security, industrial, medical, Transportation and generally all the cases which needs linear or nonlinear learning (Menhaj, 2005). The general structure of artificial neural networks consists of input layer, hidden layer, and outer layer. In this structure, a neuron is the smallest unit of data which is the basic part in neural networks operation. Instead of following set of described rules which introduced by an expert, the neurotic nets use basic rules (like input-output relations).

It is one of the most important privileges of neural networks to traditional systems (Rae, 2001). In spite of traditional statistical procedures, there is a presumption about data distribution features in artificial neural networks, therefore the independence of input variables are not considered (Carcass and Manolopoulos, 2005). During several last decades, neural networks have been used abundantly as a smart system which is made based on human neurotic system. The need of scientific world to find solutions for problems with no answer or easy made solution has been the motivation to develop smart dynamic systems of model free based on empirical data.

The artificial neural networks are grouped in dynamic systems which through empirical data processing can transfer the potential rules in data into the network (Mcandi *et al.*, 2008). One of the most important features of neural networks which its function is similar to brain structure is learning ability. Learning process in neural networks means updating net architecture and its related weights so that the network can do a special task efficiently (Azar and Khadiv, 2012). The most prominent theoretical works in imitating human brain in learning were done during 1930's, 1940's and 1950's by Alan Turing, Warren McCullough, Walter Pitts, Donald Hebb and James Von Neumann (Ghaderi).

Conceptual Definition of Learning Aspects

Learning

Result and outcome of programmed or empirical trainings which is put in one because of consecutive rehearsals or encounters then externally appears in one's behavior. Such a learning is measurable through suitable instruments (Jarvis, translated by Sarmad, 2008).

Family

Family is a group of people interconnected through some forms of family ties such as: marriage, consanguine or adapting, as a husband, wife, mother, father, brother, sister and sibling, so a mutual culture appears which let them live in a special unit (Sarokhani, 1996).

Teacher

In education process, teacher is a prominent figure who tries to transfer objectively his/her skills to learners to have students change their behaviors. Dr. Aliakbar Seif says, " a teacher is someone who shows reciprocal behavior toward one or some students, and aims in bringing changes in student(s). The alteration could be cognitive, viewpoint or movement (skillful) (Safi, 2003).

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Society

Each society should consist of humans or people who cooperate, which through this cooperation they could be changed to elements of a construction or pattern (Child, translated by Faramarzi, 1985).

Learner (Student)

A student is someone who is between 6-20 and studies in an education level in state institutes (the national charter of student's rights).

Education Environment (School)

School is the most official educational organization for youngsters. Its duty is to teach the least which without learning them one cannot afford appropriately his civil and social role (Sepahvand, 2006).

Education System

If you look at education as a system, it can be consisted of some elements which are in contraction to gain final aim(s). The main elements in a system are as follows: input; process and output. Input in education includes learner, teacher, lesson plan, pedagogical space, instruments and educational facilities, establishments and organization, budget and so on. Process includes teaching-learning process, structural-organizational and supporting process. Product consists of trainees, produced scientific works and expertise services (Bazargan, 2002).

Review of Literature

Samari and Atashak (2009), conducted a study titled as: "the effect of cognition and educational technology usage by teachers in improving students' learning process quality", they resulted that cognition and using educational technology by teachers had been few and mean. There also is a significant relationship between cognition and technology usage by teacher, on the one hand, as well as between educational materials, and instruments by teacher, on the other hand. Furthermore, utilizing educational materials and mediums, organized educational design, correct and radical evaluation during teaching can increase learning among students. Seifi *et al.*, (2010), resulted in a study: "investigating the effect of teaching brain-pivot learning on comprehension and speed of learning among third grad students in primary school", they resulted that teaching brain-pivot learning would increase comprehension and speed of learning among students so that it affects their learning quality. Trigwell and Prosser (1991), conducted a research, "improving the quality learning: the influence of learning context and student approaches to learning on learning outcomes", also concluded that perceived environments which encourage deep approaches are more likely to facilitate higher quality learning than environments designed to discourage surface approaches. Ferasinino (2012), did a study titled: "a method used in learning process: surface and deep learning among students", also conclusion that in accordance with comparing these two figures, learning each of them is related to learning other forms, which focuses on duality or orientation of a novice. Guo (2010), conducted a study titled as: "Incorporating statistical and neural network approaches for student course satisfaction analysis and prediction" they resulted that both the number of students (NS) enrolled to a course and the high distinction (HD) rate in final grading are the two most influential factors to student course satisfaction. The three-layer multilayer perceptron (MLP) models outperform the linear regressions in predicting student course satisfaction, with the best outcome being achieved by combining both NS and HD as the input to the networks.

Hardgrave *et al.*, (1994), conducted a study titled as: "Predicting graduate student success: A comparison of neural networks and traditional techniques" they resulted that:

- (1) Past studies may have been addressing the decision problem incorrectly,
- (2) Predicting success and failure of graduate students is difficult given the easily obtained quantitative data describing the subjects that are typically used for such a purpose,
- (3) Non-parametric procedures such as neural networks perform at least as well as traditional methods and are worthy of further investigation.

Christophel (2009), conducted a study titled as: "The relationships among teacher immediacy behaviors, student motivation, and learning", also conclusion that Correlations revealed significant relationships between learning and both immediacy and motivation. Regression analyses indicated both unique and colinear predictability of learning by nonverbal immediacy and state motivation. Immediacy appears to

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modify motivation which leads to increased learning. Important implications of Study Two data indicate relationships observed in earlier research were not a simple function of confounding when scores were reported by the same subjects completing multiple instruments. Contreras *et al.*, (2009), conducted a study titled as: "Performance of High School Students in Learning Math: A Neural Network Approach" also conclusion that show a good predictive level and point out the importance of using local data for fine tuning.

Research Questions

- 1-What are the effective factors in learning process?
- 2-What share is going to be allocated to each of effective factors in final structure of learning model?

MATERIALS AND METHODS

Research Method

The research method used was high descriptive. The statistical pool consists of all students attending in senior-school, north of Iran, during 2013-2014.

The sample was assigned as 240 students through using Cochran formula. If considering the sample hypocritically through using different sample units in different sizes, then we can implement multi-step sampling. To estimate the effective factors in learning of students studying in senior high schools, three steps were picked.

The sampling units were as follows, respectively: school, class, and student.

Cluster sampling is done in some stages, since through multi-step sampling, the specimen units can be distributed in society, it means all sample spectrum is utilized. In the study to pick samples (students), there was used multi-step cluster sampling.

The questionnaire includes 87 questions which were used after being naturalized and proportionate to the statistical pool. Each questionnaire holds 6 sections: learner, teacher, family, education system, and society and education environment.

The validity in accordance with Cronbach formula was 0.86 which shows high validity of used instrument.

Data analysis used to analyze data out of questionnaires on descriptive and inferential levels through implementing SPSS.

For descriptive statistics, there were used abundance, percentage, density frequency, standard deviation and variance. For inferential statistics, the researcher privileged SPSS 21 neural networks.

RESULTS AND DISCUSSION

Findings

Table 4-1: Observation summary of neural networks processing

Sample observation	Number	Percentage
Teaching	150	85/2
test	26	14/8
total	176	

As it can be seen in the table above, 26 cases were recognized as tested samples and 150 cases as under training samples in accordance with neural networks analysis. Therefore, the learners were practically divided into three groups: potent; average; weak. Each group owned different effective factors on learning. 150 cases include 85.2% of total observations in neural networks teaching and 26 cases, 14.8% consists of learning rules in testing and evaluation.

Table 4-2 shows classification of learner learning quality variables and anticipated amount in both experimental and control groups.

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Table 4-2: Classifying the anticipated amounts of neural networks in experimental and control groups

Sample	observed	Anticipated amounts			Correction percentage
		Weak	Average	Potent	
Teaching/ control	weak	37	19	1	64/9
	average	32	38	2	52/8
	potent	1	1	19	90/47
	Total	46/4	49/7	3/9	51/0
Testing/ experimental	weak	9	3	0	75/00
	average	3	8	0	72/72
	potent	0	1	2	66/66
Total percentage		47/8%	52/2%	7/69%	73/07

In above table, it reveals that in learners and teaching groups in 37cases(64.9%), they were weak learners in accordance with learning rules and neural network teaching, in 19 other cases, the learners were weak, however by learning functions and neurotic net teaching, the second code, learner was assigned as average and just in one case it was potent. Therefore, the favorite and remarkable anticipated classification is 64.9% which shows appropriate learning rules in accordance with introduced function for weak code, besides average code for learners was 52.8%(32 out of 72 cases), 32 realized as weak and just 2 were potent. In learning and teaching group, 19 cases (90.47%) were potent who assigned by learning and teaching rules, just 1 learner was potent enough, however by using learning and teaching neural networks functions, as the second code, learners were on average level, and just one case was realized as weak. Consequently, the desirable classification is 79.6% which shows appropriate learning rules in accordance with introduced operation function.

Table 4-3 estimates the participated function parameters of neural networks in learner's type dependent variable noticing some indices like: society; education system; education environment and teacher.

Table 4-3: Parameter estimation

Anticipated variables	Foreseen			output layer Sort of learning= potent
	H(1,1)	H(1,2)	H(1,3)	
Bias amount	0/116	0/475	-0/272	
teacher	-0/87	-0/028	-0/506	
education system	-0/06	0/174	0/086	
Education environment	2/139	0/627	0/194	
society	0/279	-0/055	-0/025	
family	-0/641	-0/639	-0/125	
Bias				0/831
H(1,1)				-1/039
H(1,2)				0/126
H(1,3)				-0/421

In above table, the anticipation coefficients were assigned in accordance with three functions: Hyperbolic effects about learning and teaching in neural networks in H(1,1) there is a fixed amount or the bias amount of having variables in neural network is 0.116. in two other functions, H(1,2) and H(1,3) they are 0.475 and -0.272, respectively. Teacher variable coefficient in H(1,1), H(1,2) and H(1,3) are -0.87, 0.028 and 0.506, respectively.

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In learner H(1,1) is 0.06 for education system variable coefficient in anticipated model of neural networks which shows learning type relationship. Moreover, teacher and education system as well as family alongside other variables reveal reverse relation. It is assigned that more suitable optimization in society and education environment, better learning.

Table 4-4: Classification of anticipating variables in neurotic network model

Anticipating variables	Importance index	Normalized importance index percentage
Education environment	.183	86.1%
teacher	.207	97.4%
society	.206	96.9%
education system	.213	100.0%
family	.191	90.0%

As it can be seen in above table, the importance of education environment variable is 86.1 which is assigned to order learning in accordance with classified neural networks. The second important factor in learning ordering is teacher, 97.4%, the third one is society, 96.9% which is prominent. The fourth one is education system, which stands on the first order as priority, however family, 90% as the effective variable stands on the 4th.

Discussion and Conclusion

According to research findings, replying the main question in here which relates to ordering effective factors in learning, it was shown that education system index stands as the most prominent, therefore it is understood that more adjustable an education program is in senior schools in accordance with learning objectives, not just writing down a program, but a process to improve adjustable knowledge, more improvement and development expects in students. Moreover, more careful planning through learners' education statuses, more suitable image of education development in the future for education programmers and more learning in senior schools. The second effective index in learning is teacher or instructor. Therefore, it can be concluded that active attendance of the teacher and teaching method can bring a rational evolution in learning process; however having a flexible lesson plan for each student level could be effective. Consequently, more patients a teacher is during teaching, more effective and appropriate teaching methods would be used to succeed in teaching students. The third effective index in learning relates to society.

When a social atmosphere follows behavioral justice to accept alert and genius people, the learning motivation will increase. Making trustable atmosphere toward graduates, and social respect to teachers and students can develop growth grounds in learning. The fourth effective factor in learning was family considering neural networks priority. Learning eagerness and education talent in most students cannot be blossomed for the lack of suitable cultural environment in families, or not at least goes to max development, therefore more eager in learning in a family, more learning growth among students. The fifth effective factor in learning priority was education atmosphere. Noticing this fact that environment is a bed to form most of behavioral and education features for students, it means many of emotions, habits, interests and even viewpoints can be deeply influenced by students' education atmosphere, therefore following related standards and rules in designing such centers considering mental desires can increase learning effectively. Moreover, based on neural networks model and ordering effective indices in learning, the researcher can conclude when education programming noticing learning subjects integrates, through making suitable opportunities and professional teaching methods as well as a prospective education planning, it would appear students' growth and development. Moreover, noticing this fact that family is the first personality hearth where one can learn social relationships, then family ignorance in fulfilling their roles or other grounds can affect the function of education and their children as well. On the other hand, giving importance to education atmosphere and having it in concord with education environment considering students' expectations, the learning eagerness will increase by being motivated to growth and develop.

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REFERENCES

- Adesiyun Deborahiyemi (1989)**. Some factors influencing the teaching and learning of integrated science: a case study in zaria local government. Available: <http://hdl.handle.net/123456789/2246>.
- Azar Aadel and Khadiv Ameneh (2012)**. Introducing a neurotic net model to estimate expense-activity relationship in budgeting in accordance with function. *A Scientific-survey Quarterly in Planning and Budget* **17**(2) 7-38.
- Bazargan Abbas (2002)**. *Education Evaluation [Concepts, Patterns and Function Process]*, 2nd edition (semat) Tehran.
- Bill C Hardgrave, Rick L Wilson and Kent A Walstrom (2006)**. *Predicting Graduate Student Success: A Comparison of Neural Networks and Traditional Techniques*, *Computers & Operations Research* **21**(3) 249-263.
- Cheragh Cheshm Abbas (2007)**. Investigating the influence of teaching methods on creativitivy techniques in teaching and students learning. *Islamic Nurture Magazine* **3**(5) 7-36.
- Diana Laurillard (2009)**. The processes of student learning. *Higher Education* **8**(4) 395-409.
- Gheshlaghi Mohammad (2008)**. *Psychology of Learning*, 3rd edition (Isfahan: Mani publishing co.).
- Keith Trigwell and Michael Prosser (2008)**. Improving the quality of student learning: the influence of learning context and student approaches to learning on learning outcomes. *Higher Education* **22**(3) 251-266.
- Kirkos E Monolopoulos (2005)**. *Date Mining Finance and Accounting: A Review of Current Research Trend*.
- Macvandi Payam JA, Farali Jasbi Javad and Alavi Seyed Hassan (2008)**. Choosing effective elements in predicting future share of interest in confirmed firms in stock exchange, Tehran, using a compound model of neurotic net and genetic algorithm. *A Scientific-survey quarterly, An Economic Essay* **5**(10).
- Orion N and Hofstein A (1994)**. Factors that influence learning during a scientific field trip in a natural environment. *Journal of Research in Science Teaching* **10**(31) 1097-1119.
- Rae Reza (2001)**. A new approach in management decisions. *Modarres*, 5th period **2**.
- Ricardo Contreras A, Pedro Salcedo LM and Angélicapinninghoff J (2009)**. Performance of high school students in learning math: a neural network approach, bioinspired applications in artificial and natural computation lecture notes in computer science **56** 519-527.
- Saedi Masoud (2004)**. Neurotic network functions. *Shabakeh Quarterly* **52**.
- Sepahvan Naser (2006)**. Quadruple environments of learning. *Hamshahri Newspaper*.
- Zera Nezhad Hamid and Hamid Shahram (2009)**. Predicting inflation rate in Iran economic through dynamic artificial neurotic networks [a periodical perspective]. *Amount economic quarterly periodical (considering former economic)*, 6th period **1**.