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# Proposing a Model for Evaluating the Effective Factors on Collaboration of the Learning Groups in Smart Schools (Case Study: Teachers' View of the Smart High Schools in Tehran)

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**Abstract** – The aim of the present study was to propose a model to evaluate the effective factors on cooperation of the learning groups in smart schools. The study is correlational descriptive. The population of the study includes the total number of smart high school teachers of Tehran in the academic year 2011-2012. Sampling has been multistage clustering. A number of 360 of the teachers were selected randomly for conducting the research. Three researcher-designed questionnaires were used as data collection instruments: 1) The questionnaire of the effective factors on cooperation of the learning groups ( $\alpha = 0.93$ ); 2) The questionnaire of learning motivation ( $\alpha = 0.87$ ); and 3) The questionnaire of collaboration factors in the learning groups ( $\alpha = 0.83$ ). The overall results of the study indicated that among the four studied factors, the direct effect coefficient of the preparing ground factor (0.692) had the greatest effect on collaboration of the learning groups in smart schools. The indirect effect of the mentioned factor also was the greatest based on the indices of the importance of group learning (0.415) and guidelines and strategies (0.300). According to the findings of the research, GFI index has been 0.95 and AGFI index 0.91 suggesting that the model has a rather desirable fitness.

**Keywords** – *Collaboration of the learning groups, preparing the ground, process model, process guidance, process assessment, learning motivation, smart schools.*

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## INTRODUCTION

The smart school is a kind of school whose management and control is based on the network technology and computer, most of the content of its lessons is based on electronics, and its monitoring and evaluating system is smart. Smart school is student-centered and the teacher plays a directive role. The student has access to the existing resources in schools or the external information networks and he/she is free in using resources for his/her studies. Students use two kinds of content: electronic content and the content which the teacher produces. Synchronous and asynchronous environments of discussions, questions and answers are dynamic in this school. Group collaboration is a strategy for students to be involved in the process of teaching-learning in any form. Group collaboration could be considered as participation in discussion and response sessions or working with the small groups. Group collaboration makes the basis of the growth- because they help each other in the form of a group, learn from each other and develop creativity and critical thinking. Svinivas defines group work as "an approach of education about the teaching-learning

process within which groups of learners attempt to solve a problem with each other, complete an activity or provide a product." (Paloff and Pratt, 2003). Group activity has a special importance both in formal classrooms and in classrooms which are based on information technology because it could develop the followings: 1) development of critical thinking skills; 2) co-creation of knowledge and meaning; 3) reflection; and 4) transformative learning (Paloff and Pratt, pp. 35-37). Jonson *et al* (1991) indicate that having a sense of community is a necessity for group working. However, the experts believe that collaborative activity can help the growth of a social sense in students. Therefore, the teaching-learning environment is prepared so that group work can take place more (Paloff and Pratt, 1999)

## THEORETICAL FRAMEWORK

Recent studies on learning environment in smart schools have indicated that involvement or "social presence" has been recognized as an effective group sense in learning and during the process of communication between the learners it could improve the learning outcomes and a satisfying syllabus. Tu and

Corry (2002) identified three dimensions of the social presence feeling: 1) social context, 2) online communication, and 3) interaction. Picciano (2002) perceived that there was a strong relation between the learner's perceptions regarding interaction, social presence, and learning. Gunawardena and Zittle (1997) in a study showed that having social presence feeling had a significant correlation with students' satisfaction about the curricula. The results of Kazmer's (2000) study indicated that formation of a learning group was necessary to create a social feeling and ultimately successful interaction of the learners with each other. Murphy et al. (1998) believed that asynchronous online collaboration led to the increase of learner's interaction, satisfaction and learning. However, in addition to the learner's satisfaction, group collaboration increases the learning outcomes and removes the possible feeling of loneliness some learners might have when they are working in the learning environment. Collaborative learning gives the student a kind of opportunity that they could receive vast and deep experiences, evaluate their idea in collaboration with a supportive group and receive critical and constructive feedback. The possibility of occurrence of learning goals and acquiring the required skills of a course could be increased through group activity. Conrad and Donalson (2004) state that collaborative acquisition of knowledge is a key for success in a learning environment. The activities that demand students' interaction and encourage more thinking, in order to get to common viewpoints (p. 5). Some methods through which the teacher can create collaboration are as follows: 1. Determining the duties of the small groups; 2. The duties which are asked from students in the field of research to be followed up and offer the additional resources along with their classmates; 3. Group work in case studies; 4. Simulation; 5. Doing homework in groups; 6) Asynchronous discussion in reading and discussing questions; and 7. Sending articles in the corves site, regarding the obtained feedback from the both parts. In collaborative work, a shared responsibility is needed for learning. Paloff and Pratt (2003) assert that the steps of group working are as follows: 1. Preparation of the ground; 2. Process pattern; 3. Guiding the process; and 4. Process evaluation. Preparation of the ground is connected with some activities, including explanations about the importance of group work and clear guidelines for its accomplishment. The results of a case study by Ge, Yamashiro, and Lee (2000) showed that students' participation to be involved in group work had priority and participants' cognitive development increased significantly. Preparation includes proposing the discussion topics and instructions for activity as well as assuring that the students are at ease with the utilized technology. If students haveno obscurity about the nature of the activity and the way it is done, probably,

the concerns could decrease and with the least intervention of the teacher they could move forward. The second step is the process pattern. According to Brookfield (1995), if the teacher does not want the students to be committed to the considered pattern in the process of work, students will cast doubt on group discussions (p.5). To model the group behavior in curricula and with providing opportunity for students for discussion about some parameters based on which they work with each other and with the teacher, the teacher will show how a good group working is. The third step is guiding the process. The teacher has the responsibility of guiding the process from the beginning. Brookfield (1995) believes that a teacher can not withdraw himself, because this will be the reason for him to be considered as a unobtrusive observer. The teacher should point out to what is going on in the students' mind so that logical thought could be developed among students. The fourth step is process evaluation. Every event or group activity in a class includes a kind of evaluation. This process provides a ground for the teacher to have a viewpoint whether the special goals of the learning activity have been met or not and gives opportunities to the students to acquire experience. There is emphasis on two considered concepts in evaluation in this theory. First, understanding the value of group work that students have experienced plays an important role in determining the success or failure of the activity; second, emphasis in evaluation should be based on the learning resulted through tasks.

### **The General Hypothesis of the Research**

There is a significant correlation between the four effective factors and collaboration of the learning groups in smart schools.

### **Research Hypotheses**

There is a significant correlation between preparation of the ground and collaboration of the learning groups in smart schools.

There is a significant correlation between process pattern (model) and collaboration of the learning groups in smart schools.

There is a significant correlation between guiding the process and collaboration of the learning groups in smart schools.

There is a significant correlation between evaluation of the process and collaboration of the learning groups in smart schools.

Learning motivation mediates the relationship between the four effective factors and collaboration of the learning groups in smart schools

**Methodology**

The research is correlational descriptive. The population of the present study includes all the teachers of the smart high schools of Tehran in 2011-2012. Sampling has been multi-stage clustering that finally, 360 teachers were selected randomly for the research. For data collection, two methods of library research and survey were used. Data collection instruments three researcher-designed questionnaires. 1) The questionnaire of the effective factors on cooperation of the learning groups ( $\alpha = 0.93$ ); 2) The questionnaire of learning motivation ( $\alpha = 0.87$ ); and 3) The questionnaire of Creating cooperation in group learning

in smart schools ( $\alpha = 0.83$ ). For analyzing the data, multiple correlation and structural equation model were used.

**Research Findings**

Hypothesis 1. There is a significant correlation between preparation of the ground and creating collaboration in groups of learning in smart schools.

Table 1. stepwise multiple regression about predicting the collaboration of the learning groups in smart schools based on preparation of the ground.

		<i>Sted.error</i>	<i>beta</i>	<i>t</i>	<i>sig</i>	<i>R</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F</i>	<i>sig</i>
The first stage										
Fixed coefficient	14.343	1.362		9.678	0.001	0.478	0.228	0.473	543.008	0.001
The importance of learning group	2.582	1.736	0.682	16.682	0.001					
The second stage										
Fixed coefficient	4.547	2.738		2.724	0.001	0.364	0.132	0.738	654.666	0.001
The importance of group learning	1.873	0.036	0.726	12.732	0.001					
The guidelines and strategies	0.374	0.729	0.434	7.727	0.001					

According to the results, there is a significant correlation between the importance of grouping, guidelines and strategies with collaboration of learning groups. Based on beta coefficient for each unit increase of importance of grouping, the amount of collaboration of the learning groups increases 72 units and for one unit increase of guidelines and strategies, the amount of collaboration of the learning groups increases 43 units. The results also show that the importance of grouping explains 22 percent variance of collaboration of the learning groups. By entering the guidelines and

strategies, the amount of the determined variance increases about 13 percent.

Hypothesis 2. There is a significant correlation between the pattern process and collaboration of the learning groups in smart schools.

Table 2. stepwise multiple regression about predicting the collaboration of the learning groups in smart schools based on the pattern of the process

	<i>beta</i>	<i>Sted.error</i>	<i>beta</i>	<i>t</i>	<i>Sig</i>	<i>R</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F</i>	<i>sig</i>
First stage										
Fixed coefficient	5.204	2.208		1.181	0.238	0.682	0.465	0.464	314.998	
Patterns of learning	1.034	0.051	0.682	17.748	0.001					0.001
Second stage										
Fixed coefficient	19.611	2.356		4.126	0.001	0.775	0.571	0.568	239.794	0.001
Patterns of learning providing learning opportunities	0.907	0.047	0.593	16.592	0.001					
	0.508	0.032	0.336	9.406	0.001					

As shown, there is a significant correlation between the learning patterns and providing collaborative opportunities with collaboration of the learning groups. Based on beta coefficient for each unit increase of patterns of learning, the amount of collaboration of the learning groups increases 0.59 units and for one unit increase of providing collaborative opportunities, the amount of collaboration of the learning groups increases 0.33 units. The results also show that the learning patterns explain 46 percent variance of collaboration of the learning groups. By

entering the collaborative opportunities, the amount of the determined variance increases about 57 percent.

Hypothesis 3. There is a significant correlation between guiding the process and collaboration of the learning groups in smart schools.

Table 3. Stepwise multiple regressions about predicting the collaboration of the learning groups in smart schools based on guiding the process.

		<i>Sted.error</i>	<i>beta</i>	<i>t</i>	<i>sig</i>	<i>R</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F</i>	<i>sig</i>
First stage										
Constant coefficient	25.734	1.322		9.843	0.001	0.367	0.131	0.481	723/035	0.001
Guiding the learning activities	2.835	0.046	0.452	21.269	0.001					
Second stage										
Constant coefficient	5.264	2.356		4.735	0.001	0.564	0.298	0.858	426.654	0.001
Guiding the learning activities	1.000	0.038	0.479	17.678	0.001					
Teacher's involvement with learning groups	0.745	0.029	0.567	14.742	0.001					

According to the above Table, there is a significant correlation between guiding the learning activities and the teacher's involvement with the learning groups and collaboration of the learning groups. The Table shows that guiding the learning activities determines 13 percent of variance of collaboration of the learning groups that by entering the teacher's involvement with the learning

groups, the determined variance will be increased 29 percent.

Hypothesis 4. There is a significant correlation between evaluation of the process and collaboration of the learning groups in smart schools.

Table 4. Stepwise multiple regression analysis about predicting the collaboration of the learning groups in smart schools based on evaluation of the process

		<i>Sted.error</i>	<i>beta</i>	<i>t</i>	<i>sig</i>	<i>R</i>	<i>R</i> <sup>2</sup>	$\Delta R^2$	<i>F</i>	<i>sig</i>
First stage										
Constant coefficient	27.975	2.208		12.661	0.001	0.798	0.636	0.635	633.008	0.001
Evaluation of the collaborative learning activities	1.278	0.051	0.798	25.160	0.001					
Second step										
Constant coefficient	7.802	2.356		3.312	0.001	0.870	0.756	0.755	560.666	0.001
Evaluation of the collaborative learning activities	1.002	0.047	0.624	21.475	0.001					
Evaluation of goals' achievement in collaborative learning activities	0.431	0.032	0.388	13.353	0.001					

According to the above Table, there is a significant correlation between evaluation of collaborative learning activities and evaluation of goals' achievement in collaborative learning activities with collaboration of the learning groups. Based on the beta coefficient for one unit increase of evaluation of the collaborative learning activities, collaboration of the learning groups will be increased 0.39 units. The above Table also shows that the evaluation of the collaborative learning activities

determines 63 percent of the variance of the collaboration of the learning groups and by entering the evaluation of the amount of goal achievements in group learning activities, the determined variance will be increased to 75 percent.

Hypothesis 5 .Learning motivation mediates the relationship between the four effective factors and collaboration of the learning groups in smart schools.

Table 5. Relationship among variables in structural equation model

The relationship between the variables	Effect coefficient	Error	t	Result
learning motivation → Creating cooperation in group learning in smart schools	0.691	0.025	2.52	+
the importance of group learning → Creating cooperation in group learning in smart schools	0.35	0.040	3.57	+
statement of the guidelines and strategies → Creating cooperation in group learning in smart schools	0.342	0.028	2.38	+
statement of learning patterns → Creating cooperation in group learning in smart schools	0.054	0.052	2.06	+
providing the collaborative opportunities → Creating cooperation in group learning in smart schools	0.013	0.071	2.39	+
Instructing the learning activities → Creating cooperation in group learning in smart schools	0.017	0.034	5.27	+
teacher's involvement with learning groups → Creating cooperation in group learning in smart schools	0.103	0.093	2.76	+
evaluation of learning group activities → Creating cooperation in group learning in smart schools	0.146	0.35	2.72	+
Evaluation of the achieved goals of the activity → Creating cooperation in group learning in smart schools	0.533	0.22	2.58	+
the importance of group learning → learning motivation	0.602	0.020	2.203	+
statement of the guidelines and strategies → learning motivation	0.435	0.091	3.670	+
statement of learning patterns → learning motivation	0.302	0.050	4.594	+
providing the collaborative opportunities → learning motivation	0.294	0.073	2.940	+
Instructing the learning activities → learning motivation	0.049	0.085	3.745	+
teacher's involvement with learning groups → learning motivation	0.042	0.07	2.056	+
evaluation of learning group activities → learning motivation	0.035	0.007	3.393	+
Evaluation of the achieved goals of the activity → learning motivation	0.068	0.081	3.464	+

The results of the above Table show that direct effect coefficient of learning motivation on collaboration of the learning groups in smart schools is 0.691 and indirect effect coefficient of the factor of preparing the ground based on the indices of the

importance of the group learning is 0.415, and statement of the guidelines and strategies 0.300. The indirect effect coefficient of the pattern process factor based on indices of learning patterns is 0.208 and providing collaborative opportunities is 0.203. The indirect effect

coefficient of the guiding process factor based on the indices of guiding the learning activities is 0.282, and teacher's involvement with the learning groups is 0.278. Indirect effect coefficient of the factor of process evaluation based on the indices of evaluation of the

collaborative learning activities is 0.024, and evaluation of the goal achievement of the collaborative learning activities is 0.046.

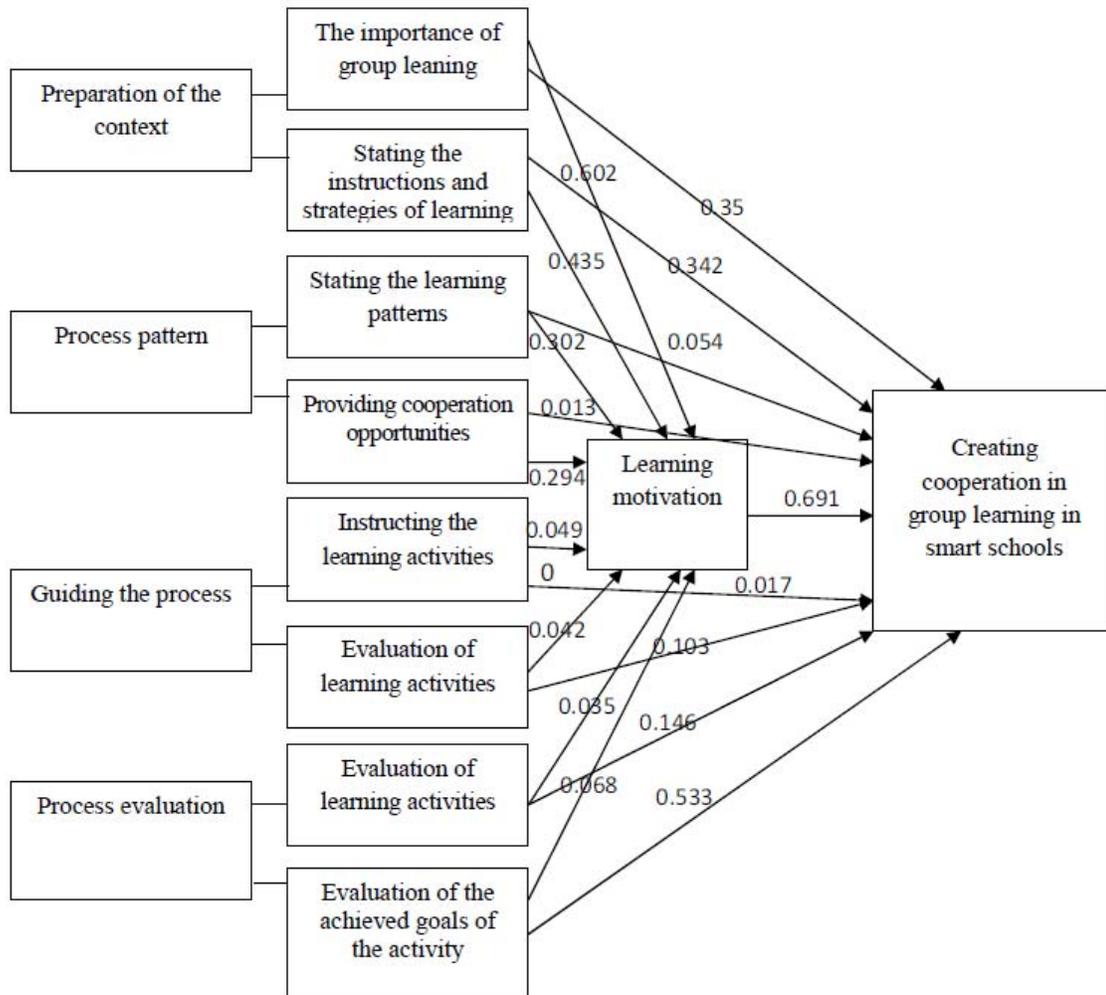


Fig. 2 : Experimental model of the effective factors on collaboration of the learning groups in smart schools

Table 6 : The evaluated indices about effective factors on collaboration of the learning groups in smart schools

Fitness indices	estimation
Goodness of Fit Index(GFI)	0.95
Adjusted Goodness of (AGFI) Fit Index	0.91
Root Mean Square Error of Approximation(RMSEA)	0.124
chi square( $\chi^2$ )	203.21
Degree of Freedom(df)	31

According to the results of the above Table, the GFI index is 0.95 and AGFI index is 0.91 which indicates the fitness of the model.

**Discussion and Conclusion**

Group activity is very important both in formal classrooms and in classrooms which are based on information technology, because it leads to 1) development of critical thinking skills; 2) co-creation of knowledge and meaning; 3) reflection; and 4) transformative learning (Paloff and Pratt, p. 35-37). The results of the present research about the first hypothesis indicated a significant correlation between preparation of the ground (stating the importance of the group activities and stating the guidelines and strategies) and collaboration of the learning groups. Based on the beta coefficient, for one unit increase of the importance of the collaborative activities, collaboration in learning groups increased 72 units and for an increase of one unit of stating the guidelines and strategies, collaboration in learning groups increased 43 units. According to Palloff and Pratt (2003), preparation of the ground is the first stage of the group collaboration and includes proposing the discussions cases and instructions for activities as well as to be assured that the students are at ease with the utilized technology. The results of the study conducted by Gi et al. (2000) indicated that the students' participation has been prior to their involvement in group activities and it significantly increased their cognitive growth. The results of the study about the second hypothesis indicated that there was a significant correlation between process pattern (learning patterns and providing collaborative opportunities) and collaboration of the learning groups. Based on the beta coefficient, for one unit increase of the learning patterns, the amount of collaboration of the learning groups increased 0.59 units and for each unit increase of providing the collaborative opportunities, the collaboration of the learning groups increased 0.33 units.

The results about the third hypothesis showed a significant correlation between process guidance (guiding the learning activities and the teacher's involvement with the learning groups) and the collaboration of the learning groups. Based on beta coefficient, for each unit increase of the teacher's involvement with the learning groups, the collaboration of the learning groups increased 0.57 units. Modeling the collaborative behavior in curriculum and providing opportunities for students about some parameters based on which they work with each other and with the teacher, the teacher specifies how good group collaboration is like. Brookfield (1995) believes that the teacher can not withdraw himself, because this makes him to be considered as an unobtrusive observe. The teacher should point to what is going on in the students' mind for the fact that critical thinking be developed between students. The results of the fourth hypothesis indicated a significant relationship between evaluation of the process (evaluation of the group learning activities and evaluation of the goal achievement of the group learning activities) and the collaboration of the learning groups. According to beta coefficient, for each unit increase of the evaluation of the group learning activities, the collaboration of the learning groups increased 0.62 units and for each unit increase of the evaluation of the goal achievement of the group learning activities, the collaboration of the learning groups increased 0.39 units. Evaluation provides a situation for the teacher to make judgment on the achievement of the goals of the activities i.e. whether they have been met or not and give the students opportunities to acquire experience. The results of the study also indicated that the effect coefficient of the learning motivation on the collaboration of the learning groups in smart schools was 0.691 which was the highest effect coefficient. After that, the highest direct effect coefficient belonged to the goal achievement of the group learning activities by 0.533 and guidelines and strategies by 0.435 respectively. The highest indirect effect coefficient belonged to categories such as importance of group learning (0.602), guidelines and strategies (0.435), learning patterns (0.302), and providing collaborative opportunities (0.294). The indirect effect coefficient of the preparing the ground factor based on the indices of the importance of the learning group was 0.415, and guidelines and strategies 0.300 indicating the fact that among the four factors, preparing the ground had the most effect on the collaboration of the learning groups. According to the results, GFI index was 0.95 and AGFI index was 0.91 that represent the relatively good fitness of the model.

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