Teamwork Behavior in Relation to Teacher, Student, Curriculum, and Learning Environment in Iranian Agricultural Higher Education System

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ABSTRACT

This study adopted a survey approach to address and determine the effects of educational system components on strengthening the teamwork behavior of students in the agricultural higher education system of Iran. The statistical population consisted of all agricultural students in five universities of Iran. A sample of 291 students was selected using random stratified sampling method with proportional allocation. A structured questionnaire was used to collect data. The data were analyzed by structural simulation technique using Smart PLS software. The results showed that there was a positive and significant relationship between teamwork behavior of students and the components of the higher education system, which included the teacher, student, curriculum, and the learning environment. The results also showed that the curriculum component had the most impact compared to other components. Also, the presented Applied Structural Equation Model is a strong theoretical model for predicting the teamwork behavior of the students.

Keywords: Iranian universities, Structural Equation Model.

INTRODUCTION

Development of knowledge and professionalization of jobs has made teamwork inevitable and necessary (Valizadeh, 2014). In fact, the presence of teams is an inevitable aspect of today's life. In the 1980s and 1990s, many authorities in higher education began to use student groups in the classroom and increase team projects in an attempt to prepare them for their job after graduation (Calhoun, 2014). Teamwork is a social structure that describes the work relationship between individuals (Volkov and Volkov, 2007). Given that teamwork is a dynamic and multi-dimensional concept, various definitions are provided based on the studied aspects (Tannenbaum *et al*., 2012). Having teamwork skills is one of the most important skills of graduates, and is of great significance in various countries, including the United States (Hart Research Associates, 2015), UK (CBI, 2011), Australia (Australian Industry Group and Deloitte, 2009), Eastern Europe (Sondergaard and Murthi, 2012) and China (Zhang and Zou, 2013). It can be claimed that in today's world, high-level graduates are those who have strong teamwork and interpersonal skills (AAGE, 2011). Employers are increasingly looking for graduate students

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with strong interpersonal skills and the ability to work effectively with others (Calhoun, 2014; Hart, 2013). From another viewpoint, the effects of team learning are positive on all levels of learning and have countless benefits such as increasing academic achievement, interest in learning and accuracy, and creativity of learners (Calhoun, 2014; McCabe and Meuter, 2011; Aramon *et al*., 2009; Khoshnodifar *et al.* 2020). In team activities, the formation of small groups of students in the classrooms will foster the effective interaction among them (Haidet *et al*., 2004; Feingold *et al*., 2008). It is, also, very helpful in improving critical thinking and problem-solving ability, changing attitude, and motivating for learning continuity (Cortright *et al*., 2005) because the involvement of students in learning situations and activities is associated with academic achievement and student satisfaction (Rouhani *et al*., 2015). Therefore, with respect to its countless benefits, it can be said that team learning is achieved through the proper interaction of the four components of the educational system including educator, learner, curriculum, and learning environment.

Components of the Educational System

In a team learning process, the educator should be able to adapt to the needs of the team members (Becuwe *et al*., 2015). In addition, they should be able to organize and structure the curriculum design process, but many educators are not familiar with this skill (Svihla *et al*., 2015). The educator can improve and strengthen the teamwork behavior of students by creating trust and participation among learners (Penuel *et al*., 2009), non-use of paper and pen in assessing the amount of learning in teamwork, and the use of suitable evaluation tools for evaluating team projects.

Despite the importance of teamwork, teamwork training at present is inadequate (Hart, 2008, 2010, 2013). Moreover, university graduates are not ready to solve challenges and must prepare themselves to work in a complex world (Bok, 2006); graduates from colleges of

agriculture are no exception (Taqipour *et al*., 2016). There is no skill as important as facilitating teamwork skills for agricultural students. Despite the importance of teamwork in agriculture, teamwork skills (adaptability, communication, coordination, decision-making, interpersonal relationships, and leadership) of agriculture students are at a low level (Aramon *et al*., 2009).

Although the educator is the main player in the teaching components, curriculum development in accordance with learner needs (program flexibility) is a key point in strengthening the teamwork behavior of students (Voogt *et al*., 2016). Thus, the focus is on the design and adjustment of collaborative curriculum content (Lewis *et al*., 2009). In fact, organizations are urging higher education authorities to pay special attention to student's teamwork in their curriculum (Chapman *et al*., 2010; Hart Research Associates, 2009). In recent years, higher education has attempted to respond to the needs of employers and as such, teamwork assignments have significantly increased throughout the curriculum (Halfhill and Nielsen, 2007; Hughes and Jones, 2011; Rafferty, 2013).

In addition to educator's support, the team also needs the university support, which includes: creation of a structure to support the team's activities (Binkhorst *et al*., 2015), setting up targeted curriculum, creating confidence in students for teamwork; encouraging collaboration and solidarity, paying attention to students' perspectives and goals, and attempting to coordinate team members (Darling-Hammond *et al*., 2009; Neumerski, 2013). According to Becuwe *et al*. (2015), there are two important conditions for supporting effective teams in an organization. The first condition is the attitude and vision of the university authorities in terms of team and teamwork, the clarity of university policy and the role of management in creating collaborative learning culture. The second is to provide facilitative structures and conditions for teamwork and, ultimately, to support educators who carry out activities as teamwork. The need for effective support in team design is an accepted principle (Becuwe *et al*., 2015; Binkhors *et al*., 2015). One of the
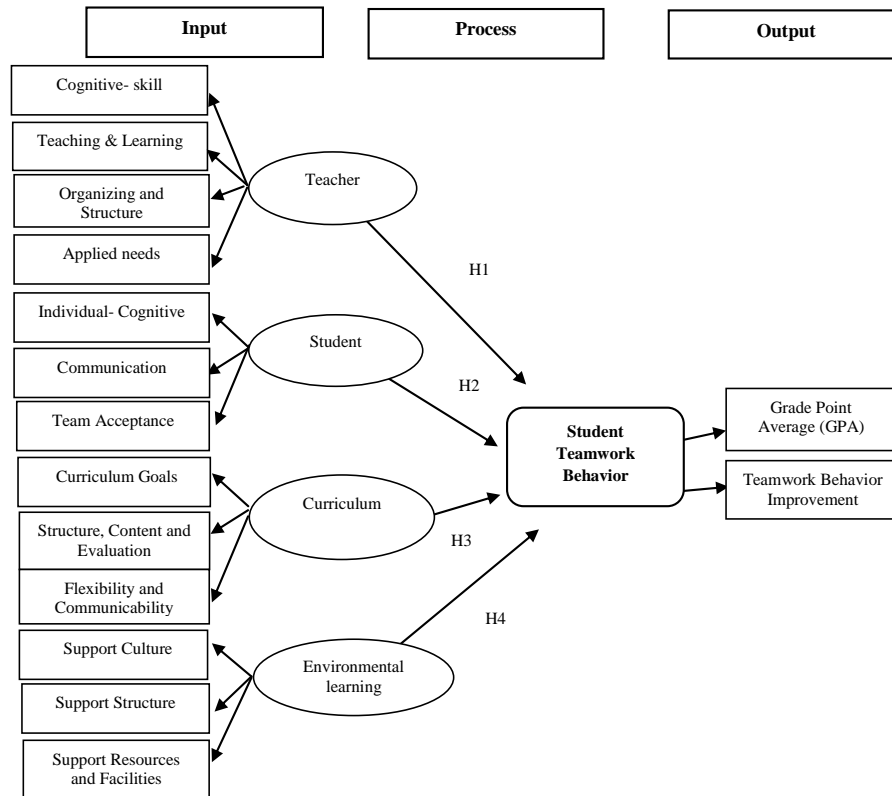
Figure 1. Impact of inputs on teamwork behavior of students and its outcomes.

problems in most Iranian universities is the low level of student participation in the school's affairs. It seems that there is no suitable program and policy for active student participation and this fact is confirmed by other research studies as well (Rahmani *et al*., 2010). In spite of the importance of the role of universities and higher education institutions in moving from student groups to effective teams, as well as the development of students' positive attitudes towards partnerships, there is relatively little literature on the role of universities in the development of knowledge, attitude and skill of students in the field of teamwork. In fact, most of the studies conducted in the field of teamwork were conducted in Engineering, Business, and Health Sciences at universities (Calhoun, 2014), and the number of studies that were made to develop student's teamwork in agriculture disciplines are limited. Therefore, this study was conducted with the aim of obtaining a better understanding and identifying the requirements for strengthening

the teamwork behavior among students in the agriculture higher education system. This paper seeks to address the components of the education system to enhance the teamwork behavior of students by designing a comprehensive model as a result of the negligence of the significant capacity to foster teamwork behavior and its problems, which has always made this field a subordinate and marginal context in the educational system agenda.

Teaching leads to learning, and a person's visible behavior (performance) indicates the amount of learning (Shabani and Pourzaire, 1994). Teamwork behavior is a combination of knowledge, skills, and attitude of team members (Nguyen *et al*., 2016). Teamwork knowledge includes common mental models and student knowledge and understanding of topics related to team, environment, actions, and programs (Nguyen *et al*., 2016). Teamwork attitudes include mutual trust (Weller, 2015), belief in the importance of teamwork, and prioritizing team approaches to

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individual approaches in dealing with problems (Reader and Cuthbertson, 2007). Teamwork skills include communication skills, creative behaviors, leadership, and management skills (Weller, 2015).

According to what was said, the major objective of the study was to investigate the effect of teacher, student, curriculum and learning environment components on strengthening the teamwork behavior of agricultural students.

MATERIALS AND METHODS

The Conceptual Framework

The conceptual framework of this research is a combination of the interaction theory and Vygotsky's socio-cultural theory of development. Vygotsky and Leontev's (1987) Activity Theory (AT) is a framework for studying various forms of human evolution. This theory focuses on interactions and conflicts between individuals and their communities. According to AT, people's behavior should be understood in the socio-cultural context of the community they belong to, as people change by interacting with and being in the environment. In the process of complex interactions between individuals and their surroundings, the individual (in this study, student) is considered as the smallest unit of analysis in the activity theory. The activity system is a framework that includes activities and interactions among individuals. This system considers human activities based on individual and social dimensions. At the individual level, the activity is a process performed by an agent (in this research, teacher), whether by an individual or a group. At the social level, it indicates those who are involved in the same subject directly or indirectly (in this research, learning environment) (Kuutti, 1996). The relationship between the individual and the society determines how individuals become consistent with norms, customs, and social relationships. Vygotsky emphasized on cultural and social issues, teaching textbooks shall in a social-cultural context and considering culture of that community in the student curriculum (in this

research, curriculum) (Tudge and Rogoff, 1999). The theoretical framework of the research is presented in Figure 1.

METHODOLOGY

Research Design

The research was a kind of descriptive correlation carried out through a survey. In this research, structural equation and partial least squares method were used to test the hypotheses and model's fitness respectively.

Participants

The research population includes 8,207 undergraduate students (third and fourth years only), MSc. and PhD. of five Iranian Public Agricultural Universities. As suggested in Krejcie and Morgan's (1970) sample size table, a sample of 291 students were selected in the current study using stratified random sampling method with proportional allocation (Table 1). A stratification system developed by the Ministry of Education was utilized for the sampling. The mean age of the students was 25.3 years. Also, 146 (50.2%) of the respondents were female and almost half of the respondents (49.8%) were male. The majority of students (36.4%) were from Tehran University, Karaj College of Agriculture and Natural Resources, and the highest frequency belonged to undergraduate students (39.2%). Besides, 84% had teamwork experience in the past and 16% had never worked in a team.

Data Collection Instrument

A questionnaire of Neestani (2014)'s behavior measurement was used to collect the teamwork behavior data. This is a modified form of the Neestani' behavior teamwork scale and includes 50 statements that measure teamwork behavior on a four-point Likert scale (From never= 1 to Always= 4). For this scale, three areas of knowledge, attitude, and skill are defined;

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- Knowledge included 14 items, e.g. "In group work I try to give all the information to the team while learning more".

- Attitude included 17 items, e.g. "I play my responsibilities well in team work and I feel satisfied with that".

- Skill included 19 items, e.g. "I minimize the problems by forming common groups in the course".

In fact, higher scores in knowledge, attitude, and skill indicate an increase in the growth of teamwork behavior. The method of scoring in this questionnaire is as follows;

- Between 171-200: A person with high-level of team spirit and teamwork skills

- Between 141-170: A person with average team spirit and teamwork skills

- Between 111-140: A person with poor team spirit and teamwork skills

- Less than 110: A person who needs more work and effort to create team spirit and teamwork skills.

The teamwork behavior of the students was measured using this tool.

The Validity and Reliability of the Research Instrument

A panel of higher-education experts and agricultural faculty members established the questionnaire face validity. Convergent validity examined the correlation of each variable with its questions (indicators) using the Average Variance Extracted (AVE) criterion, and as this correlation increases, the fit also increases. In Table 2, the results of calculating the reliability of the measured model are presented. Acceptable divergent validity in fitting the measurement model suggested that a variable in the model has more interaction with its own indicators than other variables. When the divergent validity is at an acceptable level, the AVE for each variable is greater than the variance between that variable and other variables in the model. AVE, which is

a method of discriminant validity, was also calculated.

A pilot test was conducted to explore the questionnaire's reliability, and Cronbach's Alpha coefficients ranged from 0.81 to 0.94 and all were highly satisfactory, as they were above 0.70 (Iglesias, 2004). Due to the weaknesses of Cronbach's Alpha method, such that considering the same values for all statements of a component (Zumbo *et al.*, 2007), the Composite Reliability (CR) and Factor Loadings (FL) were also used. The values of CR, FL and AVE are presented in Table 2. The components with CR more than 0.70 (Raykov, 1998) and FL more than 0.40 and AVE more than 0.50 (Iglesias, 2004) have acceptable reliability and validity, respectively.

Data Analysis

Data was collected through a postal survey and were analyzed using Structural Equation Modeling (SEM) technique and Maximum Likelihood Method. The Smart PLS software was used to estimate the model for research hypotheses. The SEM models comprise both measurement and structural models. The measurement models depict the links between the latent variables and their indicators, whereas the structural models depict the links between the latent .

RESULTS

The results are presented in three sections: assessment of the model measurement, evaluation of the structural part of the model and evaluation of the overall model.

Table 1. Statistical population and the sample studied.

University	Statistical population	Sample
University of Tehran, College of Agriculture and Natural Resources	2977	105
Shiraz University, College of Agriculture	1165	41
University of Mohaghegh Ardabili, College of Agriculture	1616	57
Shahid Bahonar University of Kerman, College of Agriculture	1202	43
Agricultural Science and Natural Resources University of Khuzestan	1247	45
Total	8207	291

Table 2. Measurement model, Cronbach's Alpha, factor loading, composite reliability and discriminant validity.

Factor	Indicators	Definition	Sample Item	Item number	∝	FL	CR	AVE
Teacher	Teacher			22	0.979		0.985	0.942
	Cognitive-skill	The ability to perform the various mental activities most closely associated with learning and problem solving	Having professional competencies in team work		0.981	0.936	0.985	0.929
	Teaching and learning	Combined processes where an educator assesses learning needs, establishes specific learning objectives	Use of modern methods and participatory teaching techniques		0.969	0.845	0.976	0.854
	Organizing and structure	How activates such as task allocation, coordination and supervision are directed toward the achievement of team aims	Providing appropriate and diverse content to improve students' attitudes and values in teamwork		0.982	0.883	0.986	0.919
	Applied needs, participation and incentive	Use of a formal scheme to promote or encourage actions or behavior of students during a defined period of time	Providing opportunity to ask students with follow-up questions		0.980	0.877	0.936	0.785
Student	Student			15	0.982		0.987	0.950
	Individual-cognitive	Refers to conscious mental activities including thinking, reasoning, understanding, learning and remembering	Good knowledge of teamwork		0.983	0.922	0.987	0.952
	Communication	The act of conveying intended meanings from one entity or group to another through the use of mutually understood signs and semiotic rules	Open communication patterns and maintaining personal and social relationships		0.988	0.819	0.990	0.933
	Team acceptance	Desire to act in team and accept of responsibility in teamwork	Respect for the role of all members in group activities		0.977	0.922	0.918	0.790
Curriculum	Curriculum			13	0.976		0.984	0.954
	Curriculum goals	Performance that expect learners to exhibit once they have completed the curriculum	Determine the objectives of the curriculum according to priorities and team values		0.986	0.914	0.988	.924
	Structure, content and evaluation	Setting out content and evaluation methods based on teamwork	Applicability of curriculum in the context of teamwork and labor market		0.952	0.946	0.969	0.912
	Flexibility and communicability	Refer to the part of compulsory curriculum in which there is flexibility or choice for students	Developing a team spirit for constructive criticism in the students		0.974	0.813	0.921	0.797
Learning Environment	Learning environment			13	0.966		0.978	0.936
	Support Culture and Environment	As the underlying beliefs, assumptions, values and ways of interacting that contribute to the unique social and psychological environment	Existence of training courses of reinforcing the team spirit in faculty members and students		0.948	0.923	0.962	0.864
	Support Structure	To create a space which is continuously reinvented by its users in relation to its context	Sending out the faculty members and students to scientific and international meetings about teamwork		0.955	0.853	0.964	0.816
	Support Resources and Facilities	often resources An available supply, especially of money, that can be drawn on when needed	Proper physical facilities and attention to the suitable organization of the classes in order to facilitate communication between team members		0.963	0.918	0.926	0.808
	Teamwork Behavior	Is a collection of behaviors exhibited by individuals and processes enacted by a team Individual behaviors consist of effort put into team tasks, the manner of interacting with others on team, and the quantity and quality of contributions made to team discussions and processes	In group and teamwork, I have a great responsibility and role, and I feel satisfied with it.		0.728		0.879	0.784
∝ ≥ 0.70	FL ≥ 0.40	CR ≥ 0.70	AVE ≥ 0.50					

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Table 3. Factor load values for each construct indicators in the form of a measurement.

Construct	Indicator	FL	SE	t-Value
Teacher	Cognitive-skill	0.936	0.006	155.989
	Teaching and learning	0.845	0.017	49.440
	Organizing and structure	0.883	0.014	64.956
	Applied needs, participation and incentive	0.877	0.015	56.743
Student	Individual-cognitive	0.922	0.010	93.868
	Communication	0.819	0.007	132.509
	Team acceptance	0.922	0.021	39.354
Curriculum	Curriculum goals	0.914	0.009	100.925
	Structure, content and evaluation	0.946	0.020	41.702
	Flexibility and communicability	0.813	0.009	102.139
Learning environment	Support culture and environment	0.923	0.010	94.194
	Support structure	0.853	0.017	49.203
	Support resources and facilities	0.918	0.008	108.112

Evaluation of the Measurement Model

In this section, the relationship between latent variables and their indicators was investigated. To determine the reliability and validity of the model, the significance level of the relationships between each latent variable with the relevant indicators was considered. The comprehensive four-based Jarvis Method was used to select the type of research measurement model. In fact, the research model was reflective, in which the direction of causal relationship between the variable and the relevant indicators was from the variable to the indicators; and in terms of the correlation between the indicators of each variable, the indicators had strong correlation. In the reflective model of this study, it was expected that with the change in an indicator, the effects of the change would be reflected in all other indicators. A Confirmatory Factor Analysis was used to determine whether the selected indicators had construct accuracy and validity.

If the factor load of each indicator with its construct has a significant t -value in 0.05 and 0.01%, it can be stated that the indicator has the accuracy required to measure that construct or latent variable. It can be said that all factor loads have a significant level of 0.01 with the structure and, therefore, they are capable of

explaining a large amount of the variance of their associated structures (Table 3).

In Table 4, the correlation matrix of the research variables is provided. The Fornell and Larker matrices were used to investigate the divergent validity and the main diameter of this matrix was the root of the AVE values for each of the 14 variables, while the values of the original matrix diameter were the same with the correlation matrix of the variables. The Fornell and Larker matrices variables are presented in Table 5. The reliability and validity of the research was confirmed because the Cronbach's Alpha coefficients, Composite Reliability, AVE and all other criteria in the estimation of factor loads were of appropriate values. As indicated in table2, the value of the AVE of each variable was greater than the correlation of the two variables in the yellow parts (Table5).

Fitting the Structural Model

In this section, the relationships between latent variables were examined. The goal was to discover whether the theoretical relations between variables were verified by the data. The results confirmed the hypothetical relationships between the latent variables. In

Table 4. Correlation matrix of research variables.

		Cognitive-skill	Teaching and learning	Organizing and structure	Applied needs, participation and incentive	Individual-cognitive	Communication	Team acceptance	Curriculum goals	Structure, content and evaluation	Flexibility and communicability	Support culture and environment	Support structure	Support Resources and Facilities	Teamwork behavior
Teacher	Cognitive-skill	1													
	Teaching and learning	0.782	1												
	Organizing and structure	.777	.634	1											
	Applied needs, participation and incentive	.788	.629	.668	1										
Student	Individual-cognitive	.008	.006	.008	.015	1									
	Communication	.021	.006	.005	.006	.741	1								
Curriculum	Team acceptance	.007	.018	.030	.007	.766	.581	1							
	Curriculum goals	.077	.079	.014	.028	.003	.015	.075	1						
	Structure, Content and Evaluation	.115	.137	.049	.083	.026	.023	.077	.775	1					
	Flexibility and communicability	.035	.065	.005	.048	.015	.020	.025	.768	.616	1				
Environment learning	Support culture and environment	.100	.070	.065	.068	.025	.050	.053	.023	.063	.018	1			
	Support structure	.103	.079	.086	.037	.031	.053	.046	.007	.060	.005	.758	1		
	Support resources and facilities	.152	.091	.126	.119	.037	.044	.066	.036	.028	.078	.779	.615	1	
	Teamwork behavior	.368	.338	.247	.268	.395	.276	.355	.524	.380	.413	.398	.334	.379	1

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Table 5. Fornell Larcker Matrix. [a]

| Factor	Indicators	Cognitive-skill	Teaching and learning	Organizing and structure	Applied needs, participation and incentive	Individual-cognitive	Communication	Team acceptance	Curriculum goals	Structure, content and evaluation	Flexibility and communicability	Support culture and environment	Support structure	Support resources and facilities	Teamwork behavior
Teacher	Cognitive-skill	0.971													
	Teaching and learning	0.782	0.964												
	Organizing and structure	0.777	0.634	0.924											
	Applied needs, participation and incentive	0.788	0.629	0.668	0.959										
Student	Individual-cognitive	-0.008	0.006	-0.008	0.015	0.975									
	Communication	-0.021	0.006	0.005	0.006	0.741	0.976								
	Team acceptance	-0.007	0.018	-0.030	0.007	0.766	0.581	0.966							
Curriculum	Curriculum goals	0.077	0.079	0.014	-0.02	0.003	0.015	0.075	0.977						
	Structure, Content and Evaluation	0.115	0.137	0.049	0.083	-0.026	-0.023	0.077	0.775	0.961					
	Flexibility and Communicability	0.035	0.065	-0.005	-0.04	-0.015	-0.020	0.025	0.768	0.616	0.955				
Environment Learning	Support Culture and Environment	0.100	0.070	0.065	0.068	-0.025	-0.050	-0.053	-0.023	-0.063	0.018	0.967			
	Support Structure	0.103	0.079	0.086	0.037	0.031	-0.053	-0.046	-0.007	-0.060	0.005	0.758	0.930		
	Support Resources and Facilities	0.152	0.091	0.126	0.119	-0.037	-0.044	-0.066	0.036	-0.028	0.078	0.779	0.615	0.903	
	Teamwork behavior	0.368	0.338	0.247	0.268	0.395	0.276	0.355	0.524	0.380	0.413	0.398	0.334	0.379	0.885

[a] The yellow values (matrix diameter) are the root of the average variance extracted (AVE), which has a higher correlation value than the correlation of other variables.

Table 6. Results of the structural model research.

Latent variable	Indicator	Standardized parameter value	Standardized error	R^2 value	Q^2
Teacher	Cognitive-skill	0.936	0.006	0.876	0.820
	Teaching and learning	0.845	0.017	0.714	0.658
	Organizing and structure	0.883	0.014	0.780	0.658
	Applied needs, participation and incentive	0.877	0.015	0.768	0.702
	Teacher-> Teamwork behavior	0.258	0.048	---	---
Student	Individual-Cognitive	0.922	0.010	0.835	0.792
	Communication	0.819	0.007	0.894	0.822
	Team acceptance	0.922	0.021	0.661	0.598
	Student -> Teamwork behavior	0.397	0.033	---	---
Curriculum	Curriculum goals	0.914	0.009	0.850	0.803
	Structure, content and evaluation	0.946	0.020	0.671	0.635
	Flexibility and communicability	0.813	0.009	0.850	0.789
	Curriculum-> Teamwork behavior	0.444	0.036	---	---
Environmental learning	Support culture and environment	0.923	0.010	0.852	0.820
	Support structure	0.853	0.017	0.728	0.658
	Support resources and facilities	0.918	0.008	0.843	0.658
	Environmental learning-> Teamwork behavior	0.409	0.031	---	---
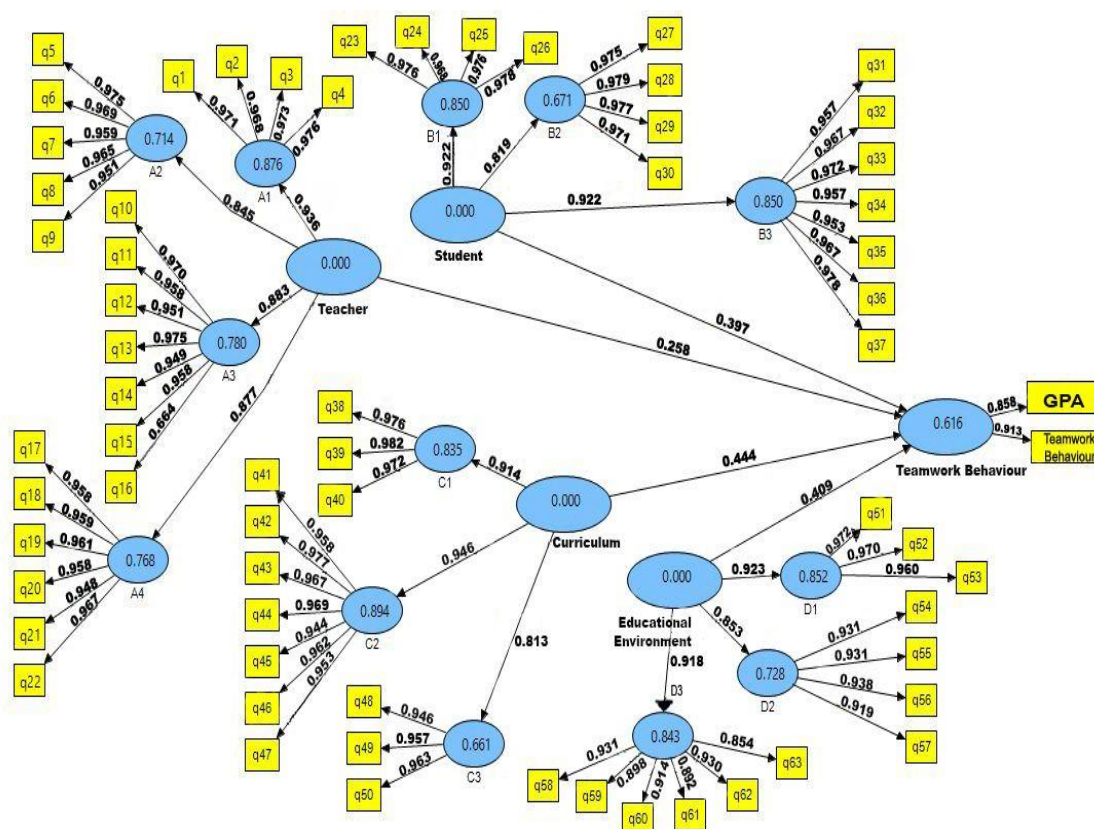
Figure 2. Model of standard coefficients.

addition, the values of "R^2" for the endogenous latent (dependent) variables of the model that indicated the effect of exogenous variables on the endogenous variables are also presented in Table 6. In fact, the three values of 0.19, 0.33 and 0.67 were the criteria for, respectively, weak, moderate, and strong "R^2" (Chin, 1998; Henseler *et al.*, 2009) and its high value indicated a better fit of the model. Given the fact that the value of R^2 for educator, learner, curriculum, teaching environment and teamwork behavior was greater than 0.67, thus the appropriateness of fitting the structural model was confirmed.

To determine the predictive power of the model, the "Q^2" criterion was used. If the relations between variables were properly defined in a model, variables would be able to influence each other's indicators enough and the hypotheses could be confirmed properly. If the "Q^2" criterion obtains values greater than 0.02, 0.15, and 0.32 for one of the endogenous variables, it indicates the weak, medium, and strong predictive power of the variable or exogenous variables associated with that model. As shown in Table 6, all values of the exogenous variable were greater than 0.32, which indicated the high predictive power of the model by exogenous variables.

According to Figure 2 and Tables 3 and 4, since the value of the t-statistic was greater than 1.96, it was concluded that "R^2" values indicate that, in the case of the educator variable, the cognitive skills of the teacher, among other characteristics, had a greater impact on the reinforcement of the teamwork behavior of the students. After that, the characteristics of organization and structure, functional needs, partnerships and incentives, and teaching/learning had the greatest impact.

In the case of inclusiveness, it could be said that their individual and cognitive characteristics have a greater impact on the reinforcement of their teamwork behavior, and after that, the communicative learning element would have an impact on strengthening the teamwork behavior. In terms of the curriculum, the structure, content, and evaluation had the most impact amongst other curriculum features, and then, the objectives of the program were flexible and communicative. Among the features of the educational

environment, the characteristics of organizational culture and atmosphere, resources and supportive facilities, and supportive structure of teamwork, respectively, had the most effect on strengthening the teamwork behavior of students.

Also, based on "Q^2" values, we can say that cognitive-skill classes, adaptation of applied needs with student participation, providing the necessary incentives from the educator with the most predictive power of the dependent variable, reinforcing the teamwork behavior, teaching and learning, organizing and structuring students to strengthen teamwork behavior have the highest predictive power. In the case of a universal variable, the individual cognitive, team-building, and communication domains have the most predictive power of the dependent variables, respectively. Structure, content, curriculum evaluation and curriculum objectives, and its flexibility and connectivity features have the highest predictive power, in order to strengthen the teamwork behavior of students.

Regarding the learning environment, it would be said that organizational culture and atmosphere, resources and facilities, and supportive structure have the highest predictive power, respectively. In general, it could be said that the structure, content, and evaluation of curriculum, cognitive-skillful teaching and learning features have the highest predictive power in strengthening teamwork behavior of students, and the results of "Q^2" verification also confirmed the evaluated results of "R^2" values. Therefore, the hypotheses proposed in this study were confirmed. In addition, due to the coefficients of the path determined between the educator, the learner, curriculum, and the educational environment with the teamwork behavior of the students, it could be claimed that the curriculum variable was more effective on strengthening the teamwork behavior of the students than the other three components of education. The learning environment and learner characteristics have a greater effect on the dependent variable of teamwork behavior (Cu: Curriculum; ST: Student; TW: Teamwork; EL: Learning Environment, TE: Teacher).

Cu -> TW 0.444 ST -> 0.397

EL -> TW 0.409 TE -> 0.258

General Fitting of the Model

The general model included measurement and structural models, and with its fit

confirmation, the fit test was complete in the model. According to the Table 7, all fit indices have acceptable levels. Therefore, the results showed a logical fit between the data and the model. Based on what was discussed so far, the experimental model of the research was as follows (Figure 3).

Table 7. Fitness index of model variables.

	Latent variable	R Square	Communality
Teacher	Cognitive-skill	0.87(	0.942
	Teaching and learning	0.71<	0.929
	Organizing and structure	0.78(	0.854
	Applied needs, participation and incentive	0.76{	0.919
Student	Individual-cognitive	0.85(	0.950
	Communication	0.67:	0.952
	Team acceptance	0.85(	0.933
Curriculum	Curriculum goals	0.83:	0.954
	Structure, content and evaluation	0.89<	0.924
	Flexibility and communicability	0.66:	0.912
Environmental learning	Support culture and environment	0.85:	0.936
	Support structure	0.72{	0.864
Teamwork behavior	Support resources and facilities	0.84:	0.816
	Teamwork behavior	0.61(	0.784
	Mean	0.78:	0.905

Regarding the three values 0.01, 0.25, and 0.36, which are considered as, respectively, weak, moderate, and strong for GOF, the 0.841 for GOF, shows the fitness of the model (Tenenhaus *et al.*, 2004).
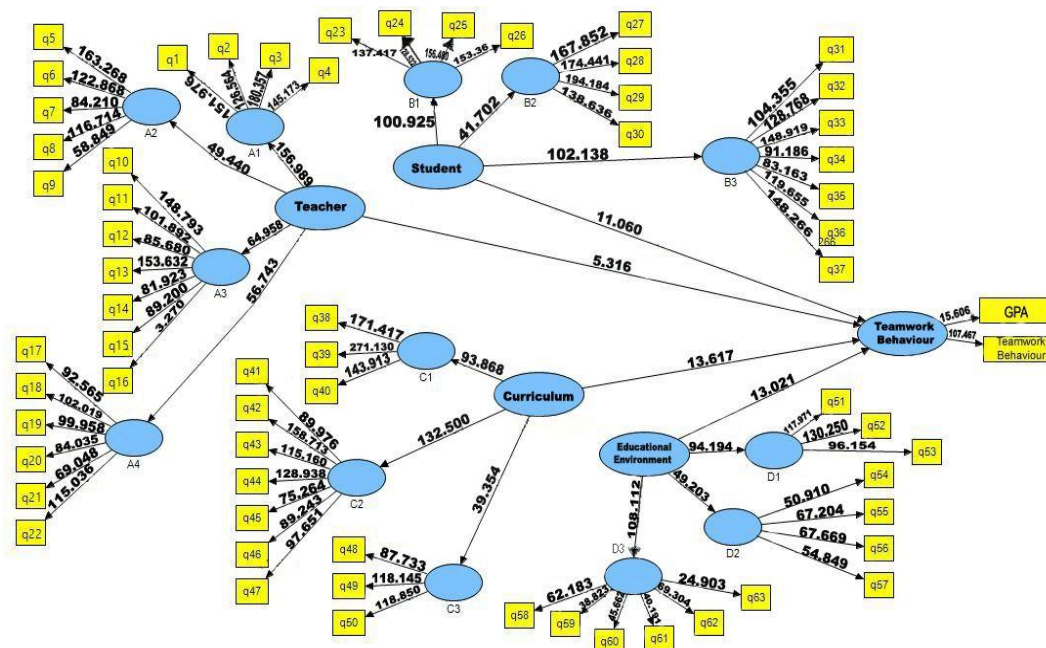

Figure 3. Structural Equation Modeling Research.

Also, there was a significant relationship between students' Grade point average (GPA) and their teamwork behavior using Pearson's test. There is a significant relationship between the level of 0.01 and the correlation coefficient of 0.699 (Table 8).

Measuring Student's Teamwork Behavior

The results of measuring the teamwork behavior of students are presented in Table 9. As it is clear, about half of the students in the domain of teamwork behavior are in the range of 141-170, i.e. in the average level of teamwork, and about 44% of them are in a poor level (111-141 range).

DISCUSSION

In this research, the role and effect of the components of the higher educational system, which included the teacher, student, curriculum, and the learning environment, was studied and analyzed as four factors of strengthening the students' teamwork behavior in the Agriculture Higher Education System. In this model, an attempt was made to provide a comprehensive view of the components of education and their effect on students' teamwork behavior based on existing resources and the views of experts in the field. To accomplish this research, four hypotheses concerning the influence of the educational system components on the strengthening of the teamwork behavior of the students were formed and each of them was confirmed. Regarding the components of teamwork behavior strengthening, the results revealed that the curriculum component had the most impact among others and a positive and significant effect on strengthening the teamwork behavior of the students. Accordingly, the educational system should strengthen the teamwork behavior of students by utilizing critical thinking skills to examine the effectiveness programs, events, and phenomena and to reflect on the outcome of activities in appropriate time intervals. By learning this skill, students would be able to organize and structure the content of the curriculum according to their own needs. This would result in a curriculum assessment based on the principles of participation and teamwork; and the assessment of students' capabilities would be based on their teamwork behavior rather than their scores. By having this skill, they can get the ideas and opinions of other students without any inaccuracies. This finding confirmed the results of Kemery and Stickney (2014).

Regarding the learning environment component, the findings also showed that the learning environment of universities has a

Table 8. Correlations between teamwork and GPA.

Correlations				
teamwork improve	behavior	Pearson correlation	Teamwork behavior improve	GPA
			1	.699**
		Sig (2-tailed)		.000
		N	291	291
GPA		Pearson correlation	.699**	1
		Sig (2-tailed)	.000	
		N	291	291

** Correlation is significant at the 0.01 level (2-tailed).

Table 9. Measuring student's teamwork behavior.

Scale	Frequency	Percent
Less than 110	9	3.09
111-140	128	43.98
141-170	145	49.82
171-200	9	3.09
total	291	100.0

positive and significant effect on the students' teamwork behavior. To do this, universities should take steps to establish honest and direct communication links between students in order to ask questions, accept errors, discuss issues, and express ideas. Students should have the opportunity to talk about new experiences, new insights and practices, and suggest the way to implement them. If this opportunity is made available, new collaborative opportunities will emerge. For this purpose, physical infrastructure, participation and teamwork culture, and university management support for team activities are needed. These findings are consistent with Paris *et al.* (2000), McGregor, 1960; Rajabzadeh and Alizadeh Sani, 2009; Poženel, (2013), Copnell *et al.* (2004), Masse *et al.* (2008), and De Wet *et al.* (2010). Regarding the role of learners in strengthening the teamwork behavior, it was noted that this component had a positive and significant relationship with strengthening student teamwork behavior. Therefore, universities should enhance students' teamwork behavior by putting students in an important, challenging and beneficial learning experience. This is very important for students in the field of agriculture, because for collaborative learning, they should develop their knowledge freely, without limitations in teamwork and participation. Accordingly, agriculture students will gain experience in identifying problems and finding solutions, and individual and team capabilities will flourish. This result is consistent with the results of the research by Hansen (2006), Poženel (2013), Masse *et al.* (2008), and La Duckers *et al.* (2008).

The results of the research indicated a positive and significant relationship between the educator and the student's teamwork behavior. This effect showed that educators at universities are able to create new capabilities by combining different realities and perspectives.

Research related to teamwork has repeatedly shown that simply gathering people will not lead to effective teamwork. Therefore, educating people about how to act effectively in the team, in other words, enjoying effective teamwork behaviors, is the basic consideration in the components of Agriculture Education system to strengthen teamwork behavior of individuals. Meanwhile, the Institutions of Higher Education play a significant role in creating and strengthening the teamwork behavior of students. In Iran, the concept of teamwork is limited to only the exercises in textbooks that are mostly overlooked by the educators for the sake of silence and they prefer the learner to perform them individually to maintain silence in the class. As the results showed, student teamwork behavior is in medium level. Therefore, the education system of the country should educate students to learn various communicational skills and abilities. In addition, by strengthening the teamwork behavior of students, they will improve their academic achievement. This finding is in line with the finding of McCabe and Meuter (2011), Aramon *et al.* (2009), and Rouhani *et al.* (2015).

In this context, the content of educational books should be changed with an emphasis on teaching teamwork skills. The educational environment of students should always facilitate teamwork, the group work spirit, behavior, and achievements; and this will lead to an increase in the level of interaction and trust among students. Since students in agricultural fields are faced with practical environment that requires a lot of experience and knowledge, the individual activity alone will not be a solution and it is imperative that all people participate in team activities and provide a practical environment for each other.

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رفتار کار تیمی در رابطه با آموزشگر، فراگیر، برنامه درسی و محیط آموزشی در نظام آموزش عالی کشاورزی ایران

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چکیده

این تحقیق، رویکردی پیمایشی جهت تعیین تأثیر مؤلفه های نظام آموزشی در تقویت رفتار تیمی دانشجویان در نظام آموزش عالی کشاورزی ایران است. جامعه آماری شامل تمامی دانشجویان کشاورزی در پنج دانشگاه ایران بود. ۲۹۱ دانشجو به‌عنوان نمونه آماری با استفاده از روش نمونه‌گیری طبقه‌ای تصادفی با انتساب متناسب انتخاب شدند. برای جمع‌آوری داده‌ها از پرسشنامه‌ای ساختارمند استفاده شده است. داده‌ها با استفاده از تکنیک مدلسازی معادلات ساختاری با استفاده از نرم‌افزار Smart PLS تجزیه و تحلیل شدند. یافته‌ها نشان داد که بین رفتار کار تیمی دانشجویان و مؤلفه های نظام آموزش عالی شامل آموزشگر، فراگیر، برنامه درسی و محیط آموزشی، رابطه مثبت و معنی‌داری وجود دارد. همچنین نتایج نشان داد که مؤلفه برنامه درسی در مقایسه با سایر مؤلفه‌ها بیشترین تأثیر را بر متغیر وابسته دارد. همچنین، مدل معادلات ساختاری ارائه شده، یک مدل تئوریکی قوی برای پیش‌بینی رفتار کار تیمی دانشجویان است.