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Team Building Elements and Their Importance According to STEAM Students

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***Abstract* - Students who choose the STEAM system type of education are required to have a talent for natural sciences and master computer skills. But also, they must master soft skills, for example coping skills and ways to cooperate with other people. During their academic years, and later in their careers, students will surely find themselves in situations where they will have to work and research as a part of a team. That requires teamwork skills, to manage the process of working within a group of people to achieve a goal. To make teamwork as efficient as possible, team leaders often incorporate team building as an activity that strengthens the team. Even though every team has its way of working, every team building contains elements important for its functioning. The research that was conducted on a sample of 87 students at the Algebra University College, in the academic year 2021/2022, intended to investigate the extent to which students recognize the importance of certain elements of teamwork, such as team building, team development, cohesion, and identifying team members' roles; and how they can be applied in teamwork and other fields related to this growing phenomenon.**

Keywords – STEAM; Soft Skills; Team Building; Team Building Elements, Teamwork

I. INTRODUCTION

Teamwork is a process of working collaboratively with a group of people to achieve a goal. It is present in business, sports, marketing associations, or school projects. As its focus is on reaching the goal, the group of people with the right skills and will for collaboration is needed for realization so team members could combine skills and exchange opinions. To stay motivated, a team needs team building [1][2].

Team building is a process that serves to strengthen the team. The main purpose of team building is to improve efficiency, not to improve interpersonal relationships. A 2008 meta-analysis showed that team development activities improve team performance and reinforce the need for subjective opinions from team members. It's often organized in companies and sports, but also education. Unfortunately, the term "team building" is often associated with a "quick fix" to poor communication and performance [1].

After successful team building, all team members should be able to describe the characteristics of effective teams, the stages of team development, and how individual differences and roles contribute to team building. They should know how to support the development of the team through its formative phases, communicate constructively, and resolve conflicts. Furthermore, they should be able to discuss the vision of their ideal team, the principles, and behaviors for leading a team's performance, and the plan to track progress in achieving their vision [1].

In their work, engineers face teamwork daily. Each team member uses their knowledge and skills in the tasks assigned to them and thus successfully completes STEM projects. That is why students must get acquainted with teamwork as soon as possible and develop communication and team skills [3].

Living in a pandemic of the COVID-19 virus has made it difficult to socialize and share experiences. Education was no exception and was greatly hampered by the pandemic. It was necessary to be educated in a very short time about the media through which the classes will take place. [4] Especially in such a difficult situation, where it was difficult to organize who will do which part of the task, define deadlines, and finally, through which media the completed task will be delivered, it was important to cultivate teamwork skills and effective communication.

II. ELEMENTS OF TEAM BUILDING

Team leaders often include team building as an activity that strengthens the team and makes it more effective. Each team building contains elements important for its functioning:

A. Trust between team members

Trust provides a sense of security and is key to successful community functioning. If there is no trust, the person spends more time with a defensive attitude. The same rules apply to teamwork. Trust in the team provides motivation, creative thinking, and better performance. A study published in the Journal of Knowledge Management showed that trust is a key element for good cooperation between team members [5].

B. Commitment to the project

Commitment to the project, and commitment to the goal for which the team was founded, create confidence that this goal will be achieved. Leaders have a big role to play here: through the support and innovation of team members, they give them the motivation to invest even more productive time in the project. If the leader does his job well, the result will be motivated employees and a team that will not fall apart in the effort and lose their moment [6][7].

C. Involvement in the goal-setting process

Involving team members in defining the goal has a positive effect on their performance and motivation, encourages productivity and each team member knows and understands his part in the business strategy. It is recommended that the team does not have only one main goal, but branch that goal into smaller goals. Such an approach will make the goal achievable [8][9][10][11][12].

D. Good collaboration between all project leaders

Leaders who recognize the importance of interpersonal relationships and collaboration in achieving team goals are often referred to as collaborative leaders. Such leaders know that they cannot control others and that the motivation of team members is of the highest importance. They transfer their knowledge and skills to others and encourage employees to take risks. They practice horizontal leadership, they consider all team members in their decisions, regardless of their position. They have the ability to empathize with all team members and look at the situation well from multiple angles. They focus on networking relationships, to establish good communication with everyone [13].

E. Cohesion

Team cohesion occurs when team members reach a common goal. They feel like they have contributed to the overall success of the group. This way of working motivates members to focus on the success of the whole team, not on their own. Cohesion can be learned, but such learning must be organic, through an application. For it to be successful, all team members must have clearly defined roles, and trust other team members and their roles [14][14].

F. Contract models

The contract defines the relationship between service providers and customers. The contract defines a prerequisite that the client must meet before the service provider can provide the service. Each team member has a contract, regardless of their hierarchical position [15][15].

G. Elite feeling

The elite feeling is a very important element for the vast majority of people who are members of a team. It is about a sense of pride in belonging to the very team of which they are members. Such a feeling increases the member's productivity and commitment to the project which the goal was established for [16][16].

H. Team building

The existence of team building is important because of its positive impact on the whole team, where all team members can create better bonds with each other. In team building, the focus doesn't have to be on work and reaching the goal, it can be getting to know each other's habits, for individuals to improve their skills. Bringing humor into team building is a good way of reducing stress among team members and creating a comfortable atmosphere between them [1].

I. Former relations between team members

Team members should be aware of the importance of treating all members equally and they shouldn't show favoritism to only some members. That can be accomplished by setting clear boundaries, especially between members that know each other outside the workplace. The leader can also help by setting clear roles and expectations for the whole team as well as creating a communication plan for both the team and the individuals [17].

J. Identifying team members' roles

Understanding exactly what a team does is important for assigning members the right role, which will lead to reaching the goal. There should be a variety of positions to fill all components important for project realization. If certain roles are missing, the team could be faced with problems in project realization [1].

K. Focus on team development

For the team to function successfully, the leader should follow its progress and inform the team about it regularly, so the members can conclude the quality of their work. If there are potential problems, the leader is the one who is responsible for finding the best solutions, but all other members should have an opportunity to conclude together if those solutions will work and what impact they will have on the team. For example, in designer teams, members are the ones who will know how to combine their skills to complete the task, and, in those situations, the leader can only suggest bringing their potential to the surface [18].

L. How difficult the goal is to reach

Setting the goal is much easier than reaching it, as the whole process can have difficulties and unexpected turns, such as lack of commitment or procrastination by some team members, short deadlines, setting unobtainable goals, or tasks badly assigned between members. But if the team has team building, even before they begin the work, where all members and the leader get to know each other and take all these things into consideration, the team will be stable, and efficient and the members will be satisfied [19].

All the above elements were used in the survey, except for the contract models element, since most respondents do not have any experience with signing contracts for team working. Team building elements were used in the study to define which elements are important to the Algebra University College students.

III. The Research Methodology

A. Research Design

The main question addressed in this study was: "How important are elements of team building to the Algebra University College students? ".

To answer this question, a study of team building was conducted among the Algebra University College students, based on the survey in January 2022 during the academic year 2021/2022. The anonymous and voluntary survey had a form of an online closed-ended questionnaire. Three

questions were related to demographic data, and the other twelve questions were about the importance of team building elements. The last twelve questions needed to be answered on the Likert's scale of importance with five degrees (from not important to extremely important).

B. Research Sample

The sample included 87 Algebra University College students of undergraduate and graduate study programs, N = 87. ≈90 % (78) of them were undergraduate students of study programs Design: 25.3 % (22), 3D Design: 12.65 % (11), Software Engineering: 20.7 % (18), System Engineering: 8.5 % (7), Multimedia Computing: 9.2 % (8) and Digital Marketing: 13.8 % (12), while ≈10 % (9) were graduate students of study programs MBA: 3.45 % (3), Digital Marketing: 2.3 % (2), Design: 1.15 % (1), Game Development: 1.15 % (1), Software Engineering: 1.15 % (1) and Data Science: 1.15 % (1).

50.6 % (44) of the students who participated were male, and 49.4 % (43) were female.

The largest number of students, which is 68 (78.15 %), is between 18 and 25 years old, while the smallest category from 46 to 50 years old contains only 1 respondent (1.15 %), as listed in Table I.

TABLE I DISTRIBUTION OF STUDENTS BY AGE (N=87)

Age of students	Number of students	Students in percentages
18-25	68	78.15 %
26-30	7	8.05 %
31-35	5	5.75 %
36-40	4	4.6 %
41-45	2	2.3 %
46-50	1	1.15 %

C. Data Collection and Analysis

The survey was developed for Algebra University College students, in the academic year 2021/2022. It was developed by using the Google Forms platform and shared via a link. The question type was closed-ended, and the data was quantitative. The results are descriptive and listed below.

IV. THE RESEARCH RESULTS

A percentage display of each team building element's importance, according to Algebra University College STEAM students' evaluation, is divided into 5 degrees of importance and is presented below. The total number of student respondents to all survey questions was N = 87.

1. ACQUAINTANCE BEFORE BECOMING A TEAM

To the first survey question "How important is it to you that team members know each other before working together in a team?", 49.42 % of students marked acquaintance before becoming a team member as an extremely important element (17.24 %) or very important (32.18 %). 27.59 % of students find it neither important nor unimportant, 12.64 % find it slightly important, and 10.35 % not important at all, as shown in Table II.

TABLE II STUDENTS' EVALUATION OF THE ELEMENT "ACQUAINTANCE BEFORE BECOMING A TEAM" (N=87)

Acquaintance before becoming a team	Frequency of responses	Students in percentages
Not important at all	9	10.35 %
Slightly important	11	12.64 %
Neither important nor unimportant	24	27.59 %
Very important	28	32.18 %
Extremely important	15	17.24 %

2. INVOLVEMENT IN DEFINING TEAM GOALS

To the second survey question: „How important is the involvement of each member in defining the team goals?", 91.96 % of students marked this as very important (26.44 %) or extremely important (65.52 %). 0 % of students believe that it is not important at all, 1.15 % that it is slightly important, and 6.89 % that it is neither important nor unimportant, as shown in Table III.

TABLE III STUDENTS' EVALUATION OF ELEMENT: "INVOLVEMENT IN DEFINING TEAM GOALS" (N=87)

Involvement in defining team goals	Frequency of responses	Students in percentages
Not important at all	0	0 %
Slightly important	1	1.15 %
Neither important nor unimportant	6	6.89 %
Very important	23	26.44 %
Extremely important	57	65.52 %

3. REALISTIC TEAM GOALS

The results of the third survey question "How important is it to you that the goal of the team is realistic?" showed that 1.15 % of students evaluated this element as not important at all, 2.3 % as slightly important, 6.9 % as neither important nor unimportant, and 89.65 % of students marked it as very important (31.03 %) or extremely important (58.62 %), as shown in Table IV.

TABLE IV STUDENTS' EVALUATION OF ELEMENT "REALISTIC GOALS" (N=87)

Realistic goals	Frequency of responses	Students in percentages
Not important at all	1	1.15 %
Slightly important	2	2.3 %
Neither important nor unimportant	6	6.9 %
Very important	27	31.03 %
Extremely important	51	58.62 %

4. COMMITMENT TO THE PROJECT (GOAL-RELATED ACTIVITIES)

To the fourth survey question: "How important is it to you to have members that are dedicated to the project (goal-related activities)?" 96.55 % of students evaluated commitment to the project (goal-related activities) as extremely important (64.37 %) or very important (32.18 %). 0 % of students answered that it is not important at all, 0 % that it is slightly important, and 3.45 % that it is neither important nor unimportant, as shown in Table V. that follows.

TABLE V STUDENTS' EVALUATION OF ELEMENT "COMMITMENT TO THE PROJECT" (N=87)

Commitment to the project	Frequency of responses	Students in percentages
Not important at all	0	0 %
Slightly important	0	0 %
Neither important nor unimportant	3	3.45 %
Very important	28	32.18 %
Extremely important	56	64.37 %

5. IDENTIFYING TEAM MEMBERS' ROLES

To the fifth survey question: "How important is a good distribution of members to positions they are most suited for?", 95.4 % or the majority of the respondents evaluated this element as extremely important (64.37 %) or very important (31.03 %). 0 % of students rated the element as not important at all, 0 % as slightly important, and 4.6 % as neither important nor unimportant, as shown in following Table VI.

TABLE VI STUDENTS' EVALUATION OF ELEMENT "IDENTIFYING TEAM MEMBERS' ROLES" (N=87)

Identifying team members' roles	Frequency of responses	Students in percentages
Not important at all	0	0 %
Slightly important	0	0 %
Neither important nor unimportant	4	4.6 %
Very important	27	31.03 %
Extremely important	56	64.37%

6. CLOSE PERSONAL RELATIONSHIPS

To the sixth survey question: "How important is it to you that in addition to a professional relationship, team members also have close personal relationships?", 13.79 % of students estimated this as not important at all, 24.14 % as slightly important, the majority (40.23 %) evaluated this element as neither important nor unimportant, and only approximately every fifth student considers that close personal relationships are an important team building element (21.84 %). 13.79 % marked that element as very important and 8.05 % as extremely important, as shown in Table VII.

TABLE VII STUDENTS' EVALUATION OF ELEMENT "PERSONAL RELATIONSHIPS WITH TEAM MEMBERS" (N=87)

Personal relationships with team members	Frequency of responses	Students in percentages
Not important at all	12	13.79 %
Slightly important	21	24.14 %
Neither important nor unimportant	35	40.23 %
Very important	12	13.79 %
Extremely important	7	8.05 %

7. STRONG LEADER

The largest number of respondents (eight out of ten students) answered the seventh question: "How important is it to you that the team has a "strong" leader?" i.e., 80.46 %, believe that this element is extremely important (42.53 %) or very important (37.93 %). 12.64 % (17) of students find it neither important nor unimportant and only 6.9 % of respondents find it slightly important (2.3 %) or not important at all (4.6 %), as shown in Table VIII that follows.

TABLE VIII STUDENTS' EVALUATION OF ELEMENT "STRONG LEADER" (N=87)

Strong leader	Frequency of responses	Students in percentages
Not important at all	4	4.6 %
Slightly important	2	2.3 %
Neither important nor unimportant	11	12.64 %
Very important	33	37.93 %
Extremely important	37	42.53%

8. TRUST BETWEEN TEAM MEMBERS

Most respondents, 90.8 % of them, who answered the survey question: "How important is trust between team members to you?", find trust between team members extremely important (57.47 %) or very important (33.33 %). A small number of respondents (9.1 %) find it not too important, from which 3.45 % of students find it neither important nor unimportant, 4.6 % slightly important and 1.15 % of students find it not important at all, as shown in Table IX.

TABLE IX STUDENTS' EVALUATION OF ELEMENT "TRUST BETWEEN TEAM MEMBERS" (N=87)

Trust between team members	Frequency of responses	Students in percentages
Not important at all	1	1.15 %
Slightly important	4	4.6 %
Neither important nor unimportant	3	3.45 %
Very important	29	33.33 %
Extremely important	50	57.47 %

9. TEAM BUILDING ACTIVITIES

Answers to the question "How important do you think team building activities are for advancement and greater team success?'' showed that team building activities are considered important by most respondents; 35.63 % of respondents find them very important and 28.74 % extremely important. 24.14 % find them neither important nor unimportant. The smallest number of respondents consider this element slightly important (6.89 %) or not important at all (4.6 %) as shown in Table X.

TABLE X STUDENTS' EVALUATION OF ELEMENT "TEAM BUILDING ACTIVITIES" (N=87)

Team building activities	Frequency of responses	Students in percentages
Not important at all	4	4.6 %
Slightly important	6	6.89 %
Neither important nor unimportant	21	24.14 %
Very important	31	35.63 %
Extremely important	25	28.74 %

10. HUMOR

The survey question ten response results on the element: "How important is that team members include humor in the conversation?" showed that respondents mostly find humor extremely important (42.53 %) or very important (37.93 %). 12.64 % of students find it neither important nor unimportant, 4.6 % of them slightly important and the smallest number of them, i.e., 2.3 % students, find it not important at all, as shown in Table XI.

TABLE XI STUDENTS' EVALUATION OF ELEMENT "HUMOR IN CONVERSATIONS" (N=87)

Humor in conversations	Frequency of responses	Students in percentages
Not important at all	2	2.3 %
Slightly important	4	4.6 %
Neither important nor unimportant	11	12.64 %
Very important	33	37.93 %
Extremely important	37	42.53 %

11. EDUCATION AND DEVELOPMENT

Most respondents, 91.96 % of them, answered the eleventh survey question: "How important is it to you that the team is constantly being educated and developed?" that education and development are extremely important (64.36 %) or very important (27.6 %). Only 5.74 % of students find it neither important nor unimportant, and 2.3 % of them slightly important. Not even one respondent finds that it is not important at all (0.0 %), as shown in the following Table XII.

TABLE XII STUDENTS' EVALUATION OF ELEMENT "EDUCATION AND DEVELOPMENT" (N=87)

Education and development	Frequency of responses	Students in percentages
Not important at all	0	0 %
Slightly important	2	2.3 %
Neither important nor unimportant	5	5.74 %
Very important	24	27.6 %
Extremely important	56	64.36 %

12. ELITE FEELING

The largest number of respondents to the (final) question 12: "How important is it to you to feel proud of belonging to a team?", i.e., 81.61 %of them, believe that "elite feeling" is a very important (48.28 %) or important (33.33 %) element. 13.79 % of students find it neither important nor unimportant. The same number of respondents find it slightly important (2.3 %) or not important at all (2.3 %), as shown in Table XIII.

TABLE XIII STUDENTS' EVALUATION OF ELEMENT "ELITE FEELING" (N=87)

Elite feeling	Frequency of responses	Students in percentages
Not important at all	2	2.3 %
Slightly important	2	2.3 %
Neither important nor unimportant	12	13.79 %
Very important	29	33.33 %
Extremely important	42	48.28 %

V. CONCLUSION

STEAM students have well-developed computer skills, but during their studies, and in later work, they are also expected to master professional teamwork and soft skills. The purpose of this research was to conclude to which level students recognize the importance of team building elements.

As shown in the presented survey results, of the 12 selected elements that are considered key to teamwork, Algebra University College students evaluated the element "commitment to the project" as the most important one with 96.55 % positive answers. The second most positively evaluated element was "identifying team member roles" with 95.4 % of positive answers. Two elements that are the third most positive are "education and development" and "involvement in defining team goals" with 91.96 % of positive answers. Other elements with a positive response are realistic goals, good distribution of members to positions they are most suited for, a strong team leader, trust between team members, and humor.

As less important elements, STEAM students evaluated the acquaintance of team members before working in a team and close personal relationships of team members because STEAM students like order and completing tasks

so personal relationships are not a necessity while they work.

On average, students do not consider any elements to be completely unimportant, which is an indicator that students, even if they haven't worked in a team yet know what the key elements of teamwork are.

Most of the survey results are in line with expectations. The only element that deviates from the expected is "team building" which, instead of the expected answer "extremely important", was answered as averagely important. That brings us to the fact that even when students know about teamwork, they are not completely sure what team building is about.

VI. Limiting Elements of the Research and Recommendations for Further Research

The results of this survey are based on students' self-assessment of the importance of team building elements.

Students may be prone to misunderstand descriptions of elements within a question, dishonesty, or unconscious answers. For the survey to attract the attention of the respondents and not to cause boredom, the number of questions was limited, and the questions were formed briefly and directly. The sample of respondents was limited to the generation of students at the Algebra University College 2021/2022. To conduct the research as well as possible, it is recommended to use a larger sample of STEAM students at different faculties.

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