

Enhancing teaming skills in engineering management students through the use of the Effective Team Player – Training Program (ETP-TP)

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Recent trends in business have pointed to teamwork as an important tool for achieving success in the workplace. This has motivated organizations to start looking for teaming skills in new employees^{1,2,3,4}. Although employers may be willing to provide on the job training, they expect that their new employees, at least, possess the understanding of why this skill is important in the organization⁵.

For this reason accreditation boards at the collegiate level such as the Accreditation Board for Engineering and Technology (ABET), the Accounting Education Change Commission (AECC), and the Joint Commission for Accreditation of Health Care Organizations (JCAHO), among others, are requiring higher education institutions to introduce teamwork activities into their curriculums^{6,7,8}.

Collaborative learning, cooperative learning and other forms of active learning are being used in classrooms as ways to promote teamwork among students and enhance their learning. Studies on these approaches, as well as on the use of groups in classroom prove that trying to incorporate teams into the classroom is a highly complex task⁹. The many elements involved in the process of introducing teaming to a classroom setting, make such incorporation even more difficult. Furthermore, when it has not been well managed it has generated in both students and teachers negative attitude toward teamwork discouraging them from the continued using of teams in the classroom^{10, 11}.

Research on the use of cooperative and collaborative learning as well as research studying the impact of the team approach on performance and attitudes toward teamwork, has been conducted on groups of people with little or no previous training on teams. Studies on team training have been focused on internal team process rather than on the importance of team members consciously understanding what a real team means, and how team members can manage the process of teaming. These authors believe that when team members consciously understand the real meaning of being a team player and how to manage the many variables present during the process of teaming, it is possible that they will be able to succeed in any team situation.

In order to achieve this understanding, a structured training program, the Effective Team Player (ETP)-Training Program (TP), has been developed and is currently being applied on engineering management students at the University of Nebraska. The ETP-TP is allowing students to understand the difference between teams and groups, barriers and

characteristics of the teaming process and factors that affect team effectiveness. Under the proposed approach, even though, team members cannot control all variables, they will be able to choose the best strategy to make the team successful based on the knowledge they have on team process and team effectiveness.

The purpose of this paper is to describe the development of the Effective Team Player (ETP)–Training Program. Even though the content of the program has been fully developed, only example of the training content is presented due to the length of the material. Also, preliminary qualitative results from its implementation on engineering management students at the University of Nebraska are presented.

Team definition

For the purpose of this study, a team is defined based on Katzenbach and Smith's and Cohen and Bailey's definition of teams because these definitions complement each other and embrace all other available definitions. Therefore, a team is defined as a collection of individuals, generally small groups, who are interdependent in their tasks because of their complementary skills. They are committed to a common purpose, set of performance goals, and approach for which they hold themselves mutually accountable and share responsibility for outcomes. They see themselves, and are seen by others, as a social entity embedded in one or more larger systems and perform tasks that affect others^{12,13}.

Team effectiveness

Another important term that needs to be clearly defined is team effectiveness. Team effectiveness, according to Hackman (1990), refers to the degree to which a group's output meets requirements in terms of quantity, quality, and timeliness (performance). The group experience improves members' ability to work as a group in the future (behavior), and the group experience contributes to individual and team satisfaction (attitude)¹⁴.

Studies indicate that there are some factors that influence team effectiveness. Factors such as the type of task⁹, internal and external team processes, and motivation factors including values, beliefs, and reward and performance assessment systems are cited as the most relevant to consider when looking for team effectiveness^{12,15,16}.

With regards to internal team processes, there are different models available in the literature showing specific characteristics that are necessary for teams to become effective^{12,17,18,19,20}. Trying to identify the most relevant and common characteristics among these models, Adams, Ruiz and Simon (2002) developed a framework to assist in the facilitation and measurement of effective teamwork. In this model, seven constructs are identified as the main characteristics that need to be present in teams in order for their internal processes become effective. The seven characteristics are: productive conflict

resolution, mature communication, accountable interdependence, clearly defined goals, common purpose, role clarity and psychological safety²¹.

Common purpose is defined as the main objective of the team, which should be understood and shared by all team members. This element should lead to the development of the team's goals.

Clearly defined goals refer to quantifiable and commonly agreed upon statements that define the actions to be taken by the team. Clear and common goals help team members maintain their focus.

Psychological safety is the shared belief that the team is safe for interpersonal risk taking²². The team climate is characterized by interpersonal trust and mutual respect in which people are comfortable being themselves. Team members are confident that the team will not embarrass, reject or punish someone for speaking up.

Role clarity is the team member's common understanding of each individual's expected role that helps to minimize misunderstandings regarding task assignments and avoid role ambiguity.

Mature communication refers to team members' ability to articulate ideas clearly and concisely, give compelling reasons for their ideas, listen without interrupting, clarify what others have said and provide constructive feedback.

Productive conflict resolution refers to the procedures and actions taken when a conflict occurs that lead to results such as facilitating the solution of the problem, increasing the cohesiveness among team members, exploring alternatives position, increasing the involvement of everyone affected by the conflict, and enhancing the decision-making process²³.

Finally, accountable interdependence refers to the mutual dependence that all team members have regarding the quality and quantity of each individual's work within the team.

Attitudes toward team work

Results from studies about the use of teamwork activities in classrooms mention that these activities help students to see the benefits of working in team^{24,25,26}. However, negative team experiences undermine students' attitude toward teamwork.

The most significant aspect affecting students' attitude toward teamwork is freeloading or social loafing^{10,27}. Social loafing refers to the reduction of individual effort exerted when people work in groups when compared with when they work alone²⁸. Social loafing makes individuals reduce their own efforts in an attempt to establish equity

in effort for achieving the task. Social loafing happens when there is not information concerning to group member's intended level of effort in conditions in which individual output is not identifiable²⁹.

Chapman and Arenson (1993) suggest that the social loafing effect can be eliminated when individual efforts or contributions are identifiable in the outcome and processes³⁰. High personal involvement, task complexity, accountability for the group product, clarity of the group goals, collective efficacy, cohesiveness of the collectivity and potential for evaluation are other variables that have been shown to mitigate social loafing effects^{13,30}. It is important to note the similarity between the variables to mitigate social loafing effects with those identified as the main characteristics of team effectiveness. It is safe to assume that it is possible that social loafing will not be present in effective teams.

Team training

Team members need to apply certain knowledge and skills, and develop a positive attitude within the team to warrant an effective team performance^{28,29,31,32} and this can be achieved through team training.

Studies on using teams in the classrooms showing student preference for individual work rather than teamwork, were designed assigning students to work in teams with little or no previous training on teamwork^{24,25,26}. The majority of studies of unsuccessful teams and negative team experiences have emphasized the need for team training⁹. Developers of cooperative learning, also strongly recommend team-building or skill-building activities prior to cooperative learning. Therefore, it is possible that learning to use tools for becoming an effective team player could make a difference in making teams in classrooms successful.

Team training is defined as an instructional process supported by tools, methods and content that combine to form particular strategies that create a context in which team skills can be practiced, assessed and learned³³. However, studies show that in the process of training in addition to instructional methods, elements such as the background and characteristics of the trainees, during training condition and organizational support, have impact on training outcomes^{33,34,35}. Taking this into account, training should be seen as a system rather than a process. Thus, team training could be defined as an instructional system in which individuals enhance knowledge, skills, and attitudes that applied in a team context result in improved team effectiveness.

There is evidence in the literature that team training works³⁴. Research on this area, however, has been focused on team training in military settings with specific characteristics such as hostile, dangerous and stressful environments, in which members are required to make complex decisions under severe time pressure³⁶.

Team training approaches

Most of the approaches proposed in the literature on team building emphasize using group dynamic activities for attempting to teach individuals how to work in teams. As main objective, these activities are focused on clarifying team members' roles and responsibilities³⁷. Activities not related to real team environments are used during the team building training. All approaches assume that group members know what it means to be a team member and what it means to perform as a team.

New approaches need to focus on teaching team members about the factors affecting team performance and effectiveness instead of team building process^{17,18,36,38,39,40}. There are many factors influencing team performance and effectiveness. Factors related to the individual, context or environment, task and group characteristics have been identified as main elements affecting team outcomes.

In the higher education environment the literature shows that learning styles, context, task, individual differences, team longevity, student preference for teaching methods, attitude toward teamwork and misunderstanding of the meaning of teams are the main factors having an impact on team effectiveness. Each of these elements can be identified with one of the main factors aforementioned. In other words any element related to context, task, individual and group characteristics would affect the outcomes of team performance.

Authors of these approaches propose that factors influencing team performance need to be controlled in order to make the team successful. Commonly, team leaders, managers, coordinators or the person on charge of the team project is who is expected to control all these variables. Some of them share this responsibility with team members. However, the majority of the variables (context, task, individuals and group characteristics) are not under their control, then how can team members or people in charge of teams manage all these variables?

The ETP- Training Program

The ETP - training program is a complete set of instructional tools that content lessons topics, resources, and activities to follow in order to train students to become effective team players.

The ETP – training program was designed based on the ETP - team training framework (See appendix 1). This framework assume that team members need to know, understand and be able to address the causes of team failure through understanding and learning about the factors that will be present during their team process. They also need to learn how these factors can affect their effectiveness. The framework proposes that

team members understanding in advance about the causes of possible barriers that they will face in their teaming process, will give them the advantage of being able of adjusting their skills and capabilities in order to overcome barriers and make the team successful.

The objective of the ETP- training program is to make team members understand that context, individual, task and group characteristics affect effective teaming. Effective teaming is defined as the process which teams go through displaying specific characteristics that make the team effective. These characteristics are mature communication, role clarity, clear goals, common purpose, accountable interdependence, psychological safety and productive conflict resolution.

The ETP-training program is designed to train individuals on understanding the difference between teams and groups, barriers and characteristics of the teaming process and factors that support and affect team effectiveness. As result, team members will be able to choose the best strategy to make the team successful based on the knowledge and skills on team process and team effectiveness that they acquired during the training experience.

The ETP - team training program follows the five main phases for designing a training program from Swanson's model of training performance system (TPS). The phases are: need assessment, instruction design, development, implementation and evaluation. The TPS model is presented as a process for developing human expertise for the purpose of improving organization, process and individual performance⁴¹. For the ETP- training program, each of these phases is developed according to the foundation of the ETP-team training framework, that is, a conscious understanding of the meaning of teams, teaming process and team effectiveness. Figure 1 shows the structure of the ETP-training program.

Figure 1. Effective Team Player (ETP) - Team Training Program. (Adapted from Swanson's model for training for performance system (Swanson and Holton, 2001))

Needs assessment	Instruction Design (Campbell's model)	Development	Implementation	Evaluation (Kirkpatrick's model)
<ul style="list-style-type: none"> • Pre-questionnaire • Team behavior protocol (TBP) 	<ul style="list-style-type: none"> • Topics/Content • Instruction design: <ul style="list-style-type: none"> ▪ Lesson design ▪ Lesson plan ▪ Delivery methods and tools 	<ul style="list-style-type: none"> • Training material development 	<ul style="list-style-type: none"> • Management and delivery of training 	<ul style="list-style-type: none"> • Reactions • Learning • Behavior change • Organizational results

Needs assessment phase: In this phase, individual and team deficiencies are detected in order to determine objectives, methods and tools of training. Even though all topics on team process and team effectiveness will be covered in the training; objectives, methods and tools will emphasize topics related to students' weaknesses in knowledge, skills, behaviors and attitudes identified in this phase.

In order to carry out the assessment, the team effectiveness pre-assessment questionnaire (TEpQ) is applied before the training sessions begin as well as Molano's Team Behavior Protocol⁴². The TEpQ is a questionnaire that measures individuals' readiness on each of the seven characteristics that make an effective teaming process as well as their attitudes toward teamwork and knowledge about team concepts. The Team Behavior Protocol (TBP) developed by Carolina Molano (2002), is a tool designed for measuring and interpreting team behavior. Even though the protocol is still being evaluated for validation and reliability, it was chosen to be used in this study because the outcomes the protocol produces measure each of the seven constructs that represent effective teaming in this study⁴². No current instrument accounts for all these variables.

Instruction design phase: In this phase, topics, content, instructional methodology and resources are identified based on the results from the needs assessment phase. This information is presented in detail in the training design program, lesson design and lesson plan. Because of the length of the material only examples of them are shown in appendices 2, 3 and 4. The training design program shows the objective of the training program, the estimated time for the training, program constraints and the training sequence. The Lesson design shows objectives, estimated time, and sequence of topics for each lesson of the program. Instructional media to be used during the lesson as well as resources needed are also shown. The Lesson Plan describes in detail activities and actions to take place in each of the training session. Specific training objectives for the session, estimated time for each activity and details of the activity are presented.

For the instructional design, the ETP-training program uses five of the eight steps of Campbell's training design model for developing instructional designs. The other three phases are already included in the overall structure of the training program.

Following Campbell's steps, the *instructional design phase* of the TEP-training program for improving team effectiveness is presented as follows:

1) Specifying training objectives: The training objectives allow specifying precisely what and how well the trainee should be able to do after training⁴³. For this training program the main objective is that at the end of the training program students will be able to work effectively in teams achieving high levels of performance (quantity, quality and timely job), team behavior (improvement of team member's abilities to work as team) and a positive attitude toward teamwork (individual and team satisfaction shown in the team members willingness to continue working on teams in the future). For each lesson plan more specific objectives for the capabilities to be learned are developed.

2) Specifying training content: Content topics are outlined in the team training program design. The main topics are: a) Why teams in Engineering: An introduction to the need of teamwork in engineering classroom; b) Definition and differences between team and group; c) Effective teams: Team effectiveness - results; d) The process of team development; e) Team development barriers; f) Characteristics of effective teaming; and g) Team, group and individual approaches: When to use them. Each of these topics is developed in more detail and presented in the lesson design forms.

3) Specifying learning methods and media: The instructional methods to use during the training are designed following the approach *know, do and reflect*. This approach is based on the premise that people learn by doing but also will be creative by reflecting⁴⁴. According to York-Barr, Sommers, Ghore, and Montie (2001), the continuous process of reflection is known as reflective practice. Reflective practice is defined as a deliberate pause to assume an open perspective, to allow for higher-level thinking processes. Reflection involves active and conscious processes of thoughts such as inquiry, analysis, metacognition and synthesis⁴⁴. One of the objectives of reflection is new or deeper understanding and insights on the content being learned. Awareness and understanding are critical elements for initiating and sustaining change in practice. New understanding without changes in behavior will not make differences in the life of a person. Reflective practice leads to improvement only when deeper understanding leads to action.

Learning to become an effective team player, it does not mean just to understand what a team means. It also requires, behaving and being conscious of what action a team member should take in order to make the team successful. Reflecting on why team effort is necessary for a specific task and the process that the team has to go through, will allow students to recognize that real teamwork is a way that everybody will benefit for the outcomes of the performance.

Based on the previous assumption and the learning capabilities described in the objectives, using Bloom's cognitive domain taxonomy, learning methods and media are chosen. Lecture, discussion, small group activities, role play, video and demonstration are used during the training program, followed by activities that allow for reflection. In the instructional lessons addressing team development, barriers on team development, and effective teaming, participants have the opportunity to actually work on teams with tasks similar to those to which they will be exposed in real student-task related teamwork. This means, that considering the objective of the ETP –training program of preparing students to be effective team players in the classroom, it is thought that unlike common group dynamic activities that use metaphoric situations for teaching team building, the activities proposed by the ETP – training program need to be based on real student task related activities and situations. These activities are videotaped and participants watch the videos for self- evaluation and reflection on the topic discussed during that session. Videos with

examples of real student teaming situation are also used when defining or identifying characteristics of teaming.

4) Accounting for individual differences: In order to take into account the individual differences in the background and motivation of students, information from the pre-assessment survey is used. This information allows the trainer to define the strategy to use to make the instruction sessions successful. Students with previous training on team building and previous positive or negative experience on teaming are 'used' as source of examples and asked to contribute to the discussion of the topics.

5) Specifying the condition of learning: The emphasis of the training program is giving students the opportunity, as much as possible, to work in teams under conditions similar to those that they will face in real work situations. Students will also receive feedback on their performance both from third parties and themselves when watching themselves in the videos.

Development phase: This phase relates to the development or acquisition of participant and instructor's training materials needed to execute the training design⁴¹. With the main objective of the team training program in mind as well as the principles for assuring transfer of learning, different materials are developed and acquired to take advantage of the instructional design. Slides, students print materials, classroom setting, videos, objects and artifacts such as videotapes, camcorders, and instructional guides to be used in role plays, case studies and reflective practice are the main tools to be used in the TEP - training program.

Implementation phase: The implementation phase refers to the actual delivery and management of the training. The instructor needs to be prepared for unexpected situations or problems during the training. A Gantt chart should be used in order to follow up the development of the training program.

Evaluation phase: The objective of this phase is to assess the effectiveness of the training. The program is effective if the outcomes of the program fulfill the objectives and outcomes expected. There are many training evaluation approaches available in the literature, but the most used in the training field is Kirkpatrick's four level framework of evaluation criteria⁴⁵. Besides assessing the trainee satisfactions of the training event (reactions), Kirkpatrick's also includes the assessment of the acquisition of knowledge, skills, and attitude (learning), behavior change during the training and after the training, and organizational results. The TEP – team training program proposes to conduct the evaluation on the four levels described by Kirkpatrick's model. Table 1 shows how each evaluation level is measured.

Table 1. Evaluation Plan

Level of Evaluation	Before	During	After
Reactions			Survey
Learning	Team Effectiveness Questionnaire, Video	Tests	Test, TEQ, Video
Behavior Change	Video		Video, Teachers' interview
Organizational Results	Department assessment from Accreditation Board		Department assessment from Accreditation Board

Evaluation Data Analysis and Report—What will you do with the data?

Reactions: Used by trainer to improve conditions of training

Learning: Shared with students as feedback, to assess what content and how much of it was learned. Used by trainer to assess if learning capabilities as stated in objectives were achieved.

Behavior Changes: Shared with students and professors to show the benefits of the use of teams in the classroom.

Organizational Results: Shared and discuss with chair of departments, faculty and Deans, as well as deployed through the academic university community to show the benefit of team training.

ETP-training program implementation

The ETP-training program was put into practice in an engineering management class during the fall semester 2003 at the University of Nebraska-Lincoln. The training program was included as part of the content for the Introduction to Engineering Management course. Eight teams with four students each were evaluated on their performance, behavior and attitude toward teamwork before and after administration of the ETP - training program.

Before the training sessions started, two instruments for needs assessment were administered in order to capture data for all intervening variables in the process of teaming and team effectiveness. Students were assessed on the seven constructs that make a team process effective according to Adams, Ruiz and Simon's Model (2002)²¹. The TEpQ was used for this pre-assessment because those existing in the literature do not cover all the constructs included in this study. A task was assigned to each team and team behavior was evaluated using the Team Behavior Protocol after videotaping all teams' sessions.

After the initial task was completed, the Team Effectiveness Questionnaire developed by Adams, Simon and Ruiz (2002) was administered and the professor of the class and external evaluators evaluated the outcomes of the task. The information obtained from the instruments allowed the researcher to develop the specific strategy for the training program. Once the assigned task was evaluated, the team training program

took place emphasizing the topics in which students showed weaknesses in the pre-assessment phase.

Following the training program, a new task with the same level of complexity as the first one was assigned to each team. The same type of evaluation was carried out on this new task. Figure 2 shows a graphic representation of the design. The tasks assigned were demanding and required teamwork with the objective of controlling the effect of task demand on team effectiveness^{9,28,36}.

Figure 2. ETP-training program implementation design

Pre-assessments			Training Intervention	Post-assessments	
* TEpQ (measure of seven constructs and attitude toward teamwork)	*Assignment of first task and videotaping	* TEQ * TBP *Evaluation by professor and external evaluators	* Team Training Program Implementation	*Assignment of second task and videotaping	*TEQ *TBP *Evaluation by professor and external evaluators

TEpQ: Team Effectiveness pre-Questionnaire

TEQ: Team Effectiveness Questionnaire

TBP: Team Behavior Protocol

Preliminary results

Even though the entire analysis of the data has not been completed yet, the preliminary qualitative results show that students felt that they improved their teaming skills after the training program. They also, expressed that the training experience helped them to understand better the meaning of being a real team member and what a real team means. They mentioned that the training experience will help them in future team situation either in their academic programs or in the work place.

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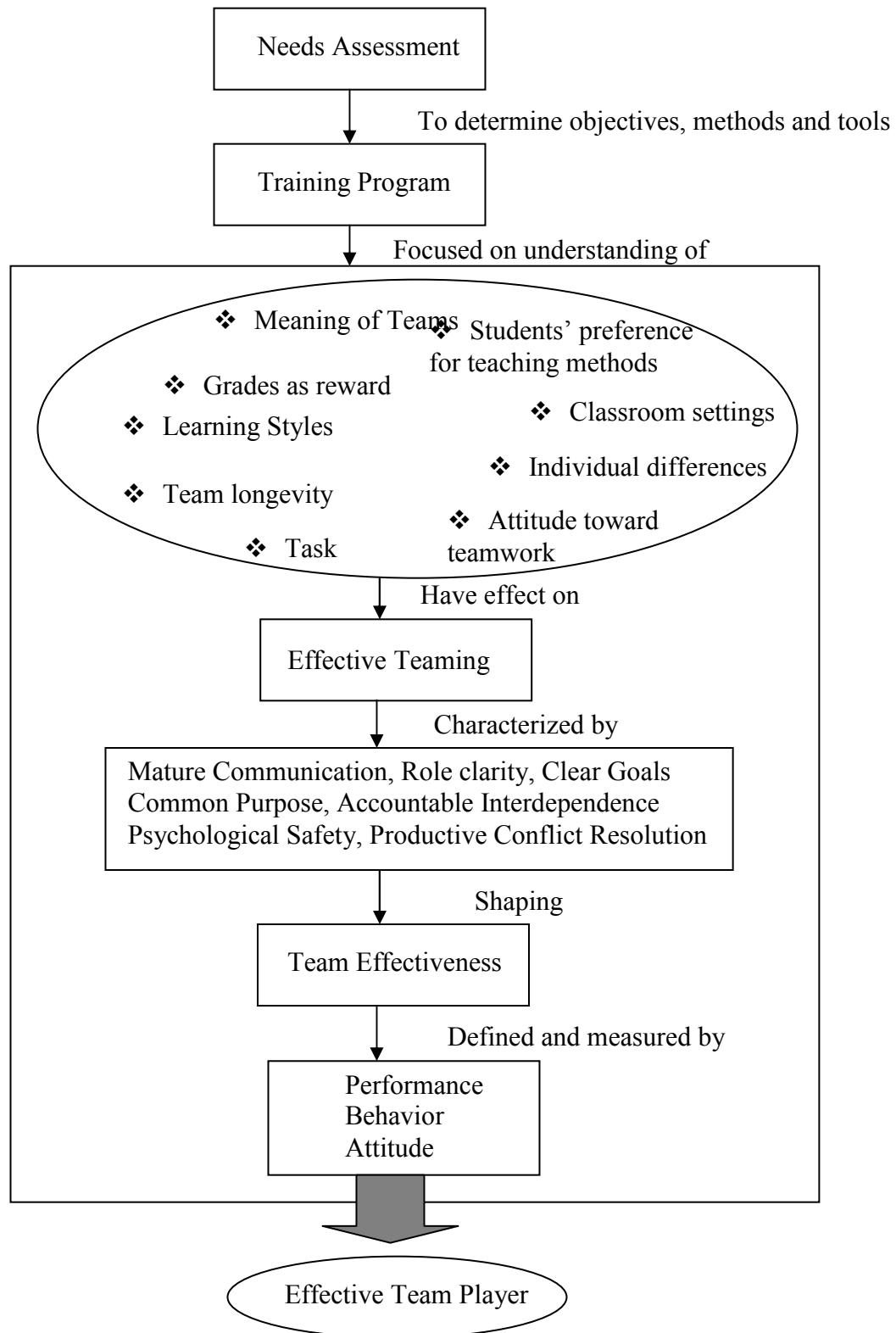
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Appendix 1. The ETP - Team Training Framework at Education Settings



Program Title: Teamwork

Pag. ¼

Objective: At the end of the training program the students are going to be able to work effectively in teams achieving high levels of performance (quantity, quality and timely job), team behavior (improvement of team member's abilities to work as team) and a positive attitude toward teamwork (individual and team satisfaction shown in the team members willingness of continuing to work in team in the future).

Total estimated time for the program: 761 min

Program design constraints:

About trainees:

Total Number of Trainees: 35

Number per group: 35

Education Level: College

Prior training in this area: to be assessed

Work Experience (amount and type): to be assessed

Other: Junior and senior engineering students

About program development:

Time available to develop: 6 weeks

Personnel Competencies available: One instructor

Media available: Video equipment, computers

Budget available: NSF Grant

About Implementation:

Where the training must take place: UNL-IMSE class

Who must deliver the training: Doctoral student

When the training must be delivered: Tuesday and Thursday (Fall semester 2003) in two sessions, 75 min each.

ETP-Team Training Program Design

Program Title: Teamwork

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Training Sequence

Lesson #	Topic	Activities	Resources
1	Why teams in engineering		
	a. Introduction	Lecture	
	b. Requirement from industry	Lecture	Slides, printed guide
	c. Requirement from ABET	Lecture	Slides, printed guide
	d. Engineering tasks	Lecture	Slides, printed guide
	e. Learning to be a team	Activity	Slide on activity
2	Team vs. Group		
	a. Characteristics of group	Video, Discussion	Videotape, VHS
	b. Group definition	Team reflective practice	Instructional guide
	c. Characteristics of team	Video, Discussion	Videotape, VHS
	d. Team definition	Team reflective practice	Instructional guide
3	Effective teams (team effectiveness - results)		
	a. Introduction		
	b. Definition	Lecture	
	c. Characteristics of effective teams i. Performance (Definition) ii. Behavior (Definition) iii. Attitude (Definition)	Lecture, case study, Group discussion, Team reflective practice	Slides, Printed material for case study, Instructional guide
4	Team development		
	a. Introduction	Lecture	Slides, Printed guide, Video tape,
	b. Forming (Orientation)	Video, group discussion, Team reflective practice	VHS, Instructional guide
	c. Storming (Conflict)		
	d. Norming (Structure)		
	e. Performing (Work)		
f. Adjourning (Dissolution)			

Training Sequence

Lesson #	Topic	Activities	Resources
5	Team development barriers		
	a. Introduction	Lecture	Slides
	b. Task structure	Video, Group discussion, Team reflective practice, Lecture	Instructional guides, videotape, VHS, Slides
	c. Purpose and Goal	Lecture	Slides
	d. Satisfaction with membership (the economics of memberships, reward/cost ratio)	Lecture	Slides
	e. Communication skills	Role play, Group discussion, Team reflective practice Lecture	Scripts for role play, Videotape, Camcorder, VHS, Instructional guide, Slides
	f. Influence (Groupthink, and conformity)	Lecture	Slides
	g. Role	Role play, Group discussion, Team reflective practice, Lecture	Scripts for role play, Videotape, Camcorder, VHS, Slides, Instructional guide
	h. Social Loafing	Video, Discussion, Lecture	Slides, Video, VHS
	i. Conflict: i. Personal (Affective, emotional or personality) ii. Substantive (team real goals and outcomes) iii. Procedural (Methods) iv. Competition h. Confrontation and escalation	Role play, Group discussion, Team reflective practice Lecture	Scripts for role play, Videotape, Camcorder, VHS, Instructional guide, Slides
i. Context or environment	Lecture	Slides	

ETP-Team Training Program Design

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Training Sequence

Lesson #	Topic	Activities	Resources
6	Effective teaming (Process)		
	a. Introduction	Lecture	Slides
	b. Definition	Video, Group discussion, Lecture	Video, VHS, Instruction guide, Slides
	c. Characteristics of effective teaming i. Common purpose ii. Clear and common goals iii. Role clarity	Group activity, Group discussion, Team reflective practice, Lecture	Instructional guide for group activity and reflective practice, Slides
	iv. Mature communication v. Accountable interdependence vi. Trust (Psychological safety)	Role play, Group discussion, Team reflective practice, Lecture	Script for role play, videotape, Camcorder, VHS, Instructional guide, Slides
	vii. Productive conflict resolution	Role play, Group discussion, Lecture, Team reflective practice	Script for role play, Videotape, VHS, Camcorder Instructional guide, Slides
7	Team, groups and individual approaches: when to use them	Group activity, Group discussion, Lecture, Team reflective practice	Instructional guide for group discussion and reflective practice, Slides

Appendix 3. Lesson design

ETP-Training program design		Program: Teamwork	Pag. 1/1
Lesson Design Topic: Why teaming in Engineering		Lesson #: 1 Estimated time: 25 min	
Objective: to understand and recognize the need of teamwork in the engineering field			
Topic	Instructional media	Est. time (min)	
1. Introduction to the lesson	Lecture	2	
2. Requirement from industry	Lecture	3	
3. Requirement from ABET	Lecture	2	
4. Engineering tasks	Lecture	2	
5. Reflective practice	Lecture	8	
6. Learning to be a team	Activity	5	
7. Summary	Lecture	3	
Resources: PowerPoint slides, printed slides. Team reflective practice sheet. Slide with description of activity.			

Appendix 4. Lesson plan

ETP-Training program design		Program: Teamwork	Pag. 1/1
Lesson Plan Lesson Topic: Why teaming in Engineering		Lesson #: 1 Session #: 1 Estimated time: 25 min	
Training objective(s): 1. At the end of the session student should understand and recognize the need of teamwork in the engineering field. 2. Students must be able to use reflective practice on their process of learning during the training program.			
Est. time (min)	Main Points	Details of instruction	
2	Introduction to the lesson	<ul style="list-style-type: none"> Instructor introduces the topic in a lecture. 	
7	Requirement of industry Requirement of ABET Engineering tasks	<ul style="list-style-type: none"> Instructor presents topics in a lecture. Hand out printed slides. 	
8	Reflective practice	<ul style="list-style-type: none"> Reflective practice: Instructor introduces the concept of reflective practice and explains the strategy to be used for using the technique during the training program. Apply reflective practice on the exercise. 	
5	Learning to be a team	<ul style="list-style-type: none"> Instructor give instruction about exercise: learning to be a team (The Pfeiffer book of successful team-building tools (2001). p. 25. 	
3	Summary	<ul style="list-style-type: none"> Instructor summarizes content and result from session. 	