



The Role of Educational Videos in the Acquisition of Teamwork Repair Strategies

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Abstract: Engineering juniors at the American University of Sharjah work in multidisciplinary teams in a required course which aims to develop professional communication skills. The teams are formed in compliance with the following requirements; teams must be comprised of three or four students and each team must contain students from at least three different engineering major disciplines. The requirements are to ensure multi-disciplinary project and teamwork. Students engage in team-building informed by the administration of the Belbin® Get-Set Self Perception Inventory (SPI) used to provide both individual and team profile preferences of the nine roles deemed by Belbin as essential for well-functioning teams. Use of this instrument is intended to raise students' awareness of the characteristics of team-role behavior and assist them to develop their capacities to work together in coordinated, interdependent ways. The Belbin® resources are helpful and valued by students and faculty, but they do not help students deal with the problem behaviors that the teams encounter. As a population our engineering juniors include individuals who exhibit the full range of difficult, obstructive conduct which is counter-productive to effective teamwork. We address the issue by identifying helpful strategies to modify behavior by the use of Video Arts Managing Problem People series. In this series six problem types are featured and twelve to nineteen minute scenarios are enacted with the outcomes being to develop understanding of how to maximize individual potential and effect positive change. A common factor that runs through all the programs is that change is two-pronged; change of leadership behavior can cause a positive change in individual behavior. Despite this, uneven team role behavior and inability to adapt to the pro-activity required by the practices of effective teams are strong challenges to many of our students. In some cases deficit team behavior is difficult to overcome and at worst team members remain incapable of change maturation. In other cases an individual's progress and achievement is negatively affected by the deficit behaviors of the majority. These issues have been the focus of a collaborative process of repair strategies developed by teaching faculty to assist student teams and individual team members to build effective and productive behaviors. In the paper the authors report on the DVDs used to sensitize team members to teamwork problems before the onset of teamwork, elaborate on a number of strategies developed and report on their perceived effectiveness as reported by faculty and students.

Keywords: Multidisciplinary, team-role behavior, repair strategies, deficit behaviors, dysfunctional team members, interpersonal communication.

Introduction

Teamwork has become an increasingly important feature of the engineering workplace in recent years (El-Sakran, Prescott and Mesanovic (2013), and engineering colleges now need to incorporate multidisciplinary teamwork in their undergraduate programs if they seek endorsement by the Accreditation Board for Engineering and Technology Inc. (ABET) of the United States. In the competitive environment in which engineering companies operate

today, "achieving more with less, satisfying more demands from clients and meeting shorter deadlines" (Crawford, 2012) are aspects of the need to operate efficiently and gain a competitive edge. Teamwork has an important role in promoting competitive edge (EL-Sakran & Awad, 2012).

The Carnegie Foundation for the Advancement of Teaching through the series *Preparation for the Professions* has pointed to the urgent need for change in the academic programs of engineering colleges, where "the solution has always been to add more rather



than to consider the overall design” (Sheppard, Macatangay, Colby, and Sullivan, 2008). Sheppard and colleagues further point out that “engineering education is primarily focused on the acquisition of technical knowledge ... students have few opportunities to explore the implications of being a professional in society” (Sheppard, Macatangay, Colby and Sullivan, 2008) other academic units have to provide these opportunities. The prevailing curricular model is linear and is characterized by “deductive teaching strategies, structured problems, demonstrations, and assessments of student learning”. Sheppard and colleagues also note this approach “does not reflect what the significant and compelling body of research on learning suggests about how students learn and develop and how experts are formed” (ibid).

Bowen (2013), reporting on research conducted on the importance of team skills and communication for modern engineering practice, concluded “in our study practitioners identified traits as well as skills, and we see a need to articulate this difference, as the implication for both management and education are significant”. Skills covered areas such as communication, interaction and efficiency (time management for instance) whereas traits included personal integrity, intrinsic drive, mutual respect and a collaborative mindset and the various sub-traits embedded in each general behavior. Bowen’s work is significant as it involved the views of industry professionals; demonstrating the kind of initiative advocated by The Carnegie Foundation.

This brief introduction emphasizes three broad issues: the need for undergraduate engineers to engage in multidisciplinary teamwork in preparation for the realities of work, the heavy technical emphasis, slow adoption and often inadequate rate of curriculum change by colleges of engineering and finally the need for apposite behavioral traits identified by industry professionals. We mention this particular combination of issues as each has an impact on the team role behavior of the students who provided the data for this study and each issue relates to the need for teamwork repair strategies beyond the standard course program provisions.

At the American University of Sharjah an engineering multidisciplinary project (EMDP) component has been incorporated into a junior year course to provide engineering undergraduates training in a range of collaborative communication and academic skills typically found in engineering workplaces (see El-Sakran & Mesanovic, 2012; Prescott, El-Sakran, Al-Assaf, Albasha, & Aloul, 2012;

Prescott, El-Sakran, Al-Assaf, Albasha & Aloul, 2011;). It is university policy that engineering students must study this course before conducting their senior design projects and prior to internship. The course contents cover communication and academic skills, these skill sets have been incorporated in the engineering multidisciplinary project (EMDP) as shown below:

- Team Topic Choice and Approval
- Collaborative Proposal Submission
- Collaborative Oral Progress Report
- Collaborative Final Oral Presentation
- Submission of Collaborative Written Progress Report
- Submission of Collaborative Final Written Report

Other important aspects of the course facilitate the multidisciplinary team work. Students are trained to conduct meetings, to plan and document decisions, to set planning goals and meet deadlines, to manage themselves and their peers, to show leadership and to evaluate their peers. There is emphasis on responsibility at personal, inter-personal and community levels developing the sense of a community of professional practice. In keeping with Bowen’s research findings the course emphasizes both skills and traits and aims to develop leadership qualities anchored in moral and ethical principles. This reflects the need engineers have for competencies beyond possessing sound technical knowledge and engineering skills. As graduates these students will require attributes of mutual accountability, interdependence and personal integrity in order to achieve common goals and pursue common purposes. In the teamwork in the AUS course students need to demonstrate socially responsible, ethical procedures and principles, a point which cannot be over emphasized.

The EMDP model can be viewed as a pedagogical tool and as having considerable agency in promoting attainment of students’ professional communication skills and personal traits. Emphasis is on team-role behavior with resulting prominence given to personal, inter-personal and team learning. Students engage in team-building informed by the use of the Belbin® Self-Perception Inventory (SPI) (Belbin ® Team Roles, 20124) and engage in management of teamwork development via Gantt chart time-based planning and meeting documentation. Furthermore, they employ collaborative team problem solving shaped by work with Video Arts *Managing Problem People* Series. These short training videos work to develop understanding of how to maximize individual potential



and effect positive change through a two-pronged approach; change of leadership behavior (can cause a positive) change in individual behavior.

3 Team Formation and Development

Writers such as Brandt (2012), Schmidt (2006), Hansen (2006) and Oakley, Felder, Brent, Elhadj, I. (2004). have outlined various ways in which teams may be formed and the positive and negative features of these different formation methods. Elements of choice or skill combinations are often used to form teams. Our students, however, are required to work in engineering multidisciplinary teams comprised of three or four students and each team must contain students from at least three different engineering major disciplines. Completion of the Belbin® Self-Perception Inventory (SPI) by each student is the most significant aid to positive team building and behavioral development. This is a questionnaire that takes about 20 minutes to complete and provides the students with a report that identifies their preferred, manageable and least preferred roles. Display of these preferences in the format illustrated in Table 1 allows a team to readily identify their strengths and shortcomings and to build team capacity accordingly. A study conducted by El-Sakran, Prescott and Mesanovic (2013) has shown that student understanding of team-role behavior has positively influenced the self-awareness resulting from completion of the Belbin SPI together with the contextualized work undertaken in engineering multidisciplinary projects. In that study results reported for both individual and team results indicated positive change in students’ understandings of the significance of team-role behavior.

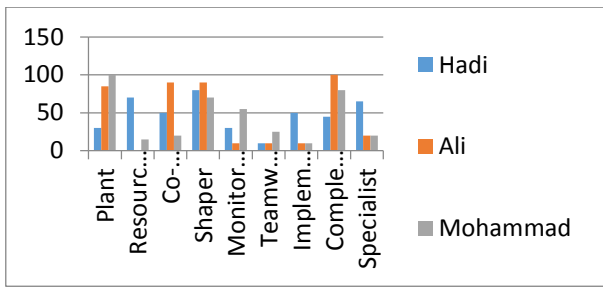


Table 1: Belbin Team Role Behaviors

The Belbin work is augmented by work with the Video Arts Managing Problem People Series (Video Arts, Managing Problem People (n. d.) with which we endeavor to help teams develop useful strategies to deal with the difficult, obstructive conduct which is counter-productive to effective teamwork and which exists in all workplaces. Teams work collaboratively

on this material as communities and build a shared template of behavior characteristics and possible tactics for modification. Gantt Chart planning is the third standard course component we use to assist teams develop the skills and traits that the individual members need if the team is to grow and be effective. The value of Gantt Chart planning is that it requires clarity about the important variables for an activity: time (start, finish, duration), tasks, personnel, deadlines are incorporated in the planning software. The example at Figure 2 is for an eight day resource investigation.



Figure 2: Time-based planning example

Work by Paris and Winograd (1990), Brimijoin, Marquissee & Tomlinson (2003) and also Tanner (2012) has showed that transferring responsibility for monitoring learning to students can enhance development of problem-solving strategies, improve their learning because of an increased metacognition which in turn can develop a sense of accountability and improve motivation. There is wide spread agreement that this approach to student learning can empower students and improve their performance and enhance their knowledge outcomes (e.g., Oakley, Felder, Brent, Elhadj (2004). Certainly amongst the majority of our students this is the result after a semester of consistent,



genuine application. Evidence is often provided in the course evaluation comments that students are obligated to provide near the close of an academic semester. These benefits notwithstanding uneven team role behavior and persistent inability to adapt to the pro-activity required by the practices described thus far in this paper are the greatest challenges faced by students. This is echoed by Oakley et al (2004) who point out that:

Being part of an ineffective or dysfunctional team may well be inferior to independent study in promoting learning and can lead to extreme frustration and resentment. Students are not born with the project management, time management, conflict resolution, and communication skills required for high performance teamwork. If team assignments are to be given, explicit steps should be taken to help students learn those skills and to equip them to deal effectively with the logistical and interpersonal problems that commonly arise in collaborative efforts (p. 9)

In the gravest cases team dys-functionality is never successfully overcome and some students remain incapable of change maturation. Sometimes an individual's progress and achievement is negatively affected by the deficit behaviors of the majority, at other times an individual team member's immaturity and their paucity of higher order cognitive and affective skills is the problem. Over the past three semesters these deficit issues have increasingly been addressed by faculty with a variety of techniques. The remainder of this paper discusses the role of some educational DVDs on teamwork repair strategies, shown to students at the beginning of the teamwork, in guiding them deal with dysfunctional team members and details the main strategies which were considered by the students to be the most effective.

This collection of DVDs presents cases of typical teamwork problems and demonstrates to inexperienced managers and team leaders how to change a problem person into a cooperative and positive team member. The whole collection is titled: "Managing Problem People Series. It comprises six DVDs; each focusing on one encountered behavioral problem and supplies practical and measurable steps as remedy. For example, the DVD titled: *Moaning Minnie* (19 minutes) shows that Minnie is all too happy to point out why something can't be done. The DVD later shows how the manager, in a heart to heart talk and praise and boost of the confidence of the person's capabilities, has managed to transform this person into a productive one. The other DVD (*Big Mouth Billy*, 16 minutes) shows Billy, who consistently overpromises, but underdelivers. He

finally becomes a performer, but only when a more realistic workload with achievable deadlines and interim reports are suggested. In a nutshell, all the videos:

- Give training in management and interpersonal skills;
- Are amusing and fun to watch;
- Stress that an employee's behavior is a response to the manager's behavior;
- Show that a manager's behavior can change the person's behavior; and
- Demonstrate that one can't change someone's personality, but can improve performance.

For more details and elaborations on these videos, the reader is referred to this link: <http://www.videoarts.com/?resolvedProductId=19962&category=leadership/&product=managing-problem-people>

5 Procedures

At the beginning of the Spring Semester 2013 students, in twenty sections taught by different faculty were shown the videos, one at a time, and a class discussion followed. Each section consisted of 20 engineering students belonging to varied major disciplines. The focus of the class discussion was on:

- The problem presented in the video
- The repair strategy(ies) used to correct the problem
- How successful and effective the strategy(ies) is (are)?
- Would you use any of these with dysfunctional team members in your team?
- Are there any other strategies that are not mentioned in the videos that you would use?
- Would you use more than one strategy with the same team member?
- Is there any particular order for these strategies?

6 Data Source

At the end of the Spring Semester 2013 all 197 students (50 teams) in the course cohort were required to respond to a brief five question survey concerning teamwork (see Appendix A). The survey was posted on the AUS CMS, Blackboard; the students submitted their surveys online. The purpose of the survey was to obtain student opinion about teamwork problems that they felt impeded their work during the semester and



whether the videos shown to them helped in choosing a successful repair strategy.

The survey is part of continual monitoring and modification of the course. Teamwork accounts for 41% of the course total so team member behaviors that inhibit the reasonable progress of others has serious implications for many students. Scholarship holders need to maintain an acceptable GPA in order to retain their award thus student opinion is rightly an important component of course review and revision. A full iterative analysis of the responses by the faculty teaching team has not yet been completed. The results discussed here focus on four clearly evident and recurrent issues that a preliminary review of the responses reveals. It is fair to say then that the material discussed in this paper is indicative but not wholly substantive.

8 Results and Discussion

Disruptive behaviors

An initial appraisal of the survey data revealed four disruptive behaviors consistently identified by the student respondents. They are:

- A number of teams had uncooperative members who did not respond to any form of communication
- Procrastination and a failure to complete work by agreed submittal dates
- Submission of individual work at a level of quality unacceptable for the team which resulted in other team members redoing the work
- Lack of commitment and/or a failure to take the course seriously

7 Repair Strategies

The survey results indicate that members in teams with dysfunctional members found the videos useful in giving them guidance as to several repair strategies to be used in putting dysfunctional members back on track and correcting their behaviors. 97% indicated that they would talk to the team member and ask him/her what is keeping/stopping him/her from doing the work assigned to him/her. In other words, they look into the reasons first and then decide what repair strategy to use. Some of these reasons were:

- Other team members are more serious and would do the others' work because they cannot risk getting a low grade.
- They did not fully understand the work required of them.

- They are not serious and do not care whether the work is completed or not.

Then, in response to the above, other team members used the following strategies to get dysfunctional team members to do their work:

- Persuasion and confidence building: They informed the team member that this is team work and without your cooperation we would not be able to finish the work. We know that you can do the work assigned to you.
- Clarifying the amount and the scope of the required work and offering to show the member how the work is to be done.

In case of noncompliance, the team members resorted to other strategies. One of these was using group email messages to all team members and requesting them to complete the work by the set deadlines. If this did not work, then the professor was cc-ed of subsequent correspondence between the team members and the dysfunctional team members. This strategy, albeit being very threatening, was very effective with weak or unproductive students who did not want to lose face in front of the professor or their team. Students saw this strategy as "much more professional than regular professor-student meeting, as if it is a real business meeting where everyone wanted his chance to contribute with ideas". The success of this strategy, copying the professor into every email to team members, has made it a practice in all team correspondence. This has generally brought positive results to team work.

Furthermore, we now require student teams to establish a Dropbox or Google Drive account and invite their professor as a participant in the account. Each team member has a folder into which action items [task, outcome, delivery, timeframe] and the completed work can be filed. This allows the professor to check on work assigned and completed and target deficit behaviors and poor performance. Another strategy which also worked was for team leaders to send out updated schedules on a regular basis and reminders to team members BEFORE submission dates. This was especially effective if the reminder was also copied to the professor.

To overcome the problem of some team members' weak writing skills, the professors consistently require the students to benefit from the services offered by the Writing Center at the American University of Sharjah (AUS). The AUS has an active Writing Centre with well-trained tutors who are available to assist students critique their work. A productive strategy in this regard has been to require students to establish a link with a



tutor early in the semester and take personal responsibility for ensuring an acceptable standard of work. Suitable students from the junior engineering year are recommended annually for the Writing Centre to ensure a continual supply of tutors. Some teams form editing committees and the members oversee work quality. The disadvantage of this strategy is that the students most in need of engagement and improvement may not be part of the editing process.

Junior engineers at AUS exhibit a wide range of maturity and learning capabilities. Many students have been educated in passive, teacher-centered memorization-recall systems; an approach which tends to be reinforced by the linear, structured acquisition of technical knowledge in the AUS College of Engineering programs. For some students the contrast between the problem-solving approach of engineering where a clear outcome can be achieved and the behavioral issues generated by a typical team for which problem-solving may or may not be successful is a distinction they are unable to embrace. Another successful strategy that the course instructors implemented was the use of peer evaluation (Appendix B). This tool, applied ethically, is a powerful tool in helping to improve this situation. The students are given a peer evaluation form in which they have to assess the work carried out by each team member, his/her seriousness, punctuality to team meetings and commitment. Another strategy used was personal counseling of the apathetic student and the team leader in order to assist her/him deal effectively with the issue. This approach is valued by students as the following comments attest.

Most importantly, the professor gave confidentiality the highest priority. In my opinion, this is the most important skill a professor should use and make clear (of). With respect to the strategies, first, communicating with the group on a daily basis and assigning new tasks and deadlines, was the initial strategy. In fact, it was the most common strategy emphasized by the professor. He actually tried his best not to intervene and contact the group members directly. He rather preferred to train the team leader to stand up for himself and get the group together.

Extremely effective I should say. I actually feel that this is the best thing I learnt in this course, how to actually lead a team without my superior dealing with the members directly.

9 Conclusions

The course alluded to in this paper used to be only a technical writing course. Incorporation of

multidisciplinary teamwork built around the semester-long project has placed emphasis on a range of skills and traits as essential behaviors for success in the teamwork component of the syllabus. In Bowen's (2013) research the essential skills are communication, collaborative, interactional and management/efficiency skills. The valued traits include personal integrity, self-motivation, mutual respect and a commitment to the team. From the disruptive behaviors identified in this paper one can infer defective skill development and immature personal trait growth. While it might be claimed that some repair strategies appear coercive the concerns in applying repair are twofold. First, the deficit behavior needs to be altered in order that the majority may prosper as a professor's duty of care is to ensure appropriate opportunities for all students to realize their full potential. Second, the repair should be viewed as a growth opportunity not only for the dysfunctional team member but for all involved. It is well to remember that in the world of work teams rarely function at full effectiveness and that inappropriate behavior is common. If this were not so *Managing Problem People* would not be the best seller it has become nor would Meredith Belbin's ideas have found such ready acceptance worldwide.

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Appendix A

ENG207 Course Feedback

May, 2013

We wish to gather some important information from students concerning two aspects of the ENG207. Please complete this brief survey before the closing date and submit it to iLearn.

Team-role behavior

1. What examples of disruptive, dysfunctional behavior intruded on your EMDP team work?
2. Did you find the Teamwork Repair Strategies DVDs (i.e. Moaning Liz, Managing Problem People, Lazy Winnie, etc.) shown and discussed in class useful in this respect?
3. Did you report these to your professor? If yes, how? (e.g., privately, in class or by email?)
4. What specific strategies did your professor use/suggest in helping you overcome these problems?
5. What were the outcomes?
6. In your view how effective were the strategies?

Appendix B

ENG 207 English for Engineering PEER EVALUATION

Spring 2013

Please rate your team members on the relative contributions that are being made in preparing and submitting your team project. *Your ratings will not be disclosed to other students. Be honest in this evaluation!*

In rating your peers, you should take into consideration the points listed in the following table. Insert your peers' names and the points in the following table.

No.	Name of Team Member	Point Scale					Total Score
		Actively participated in team discussions & meetings 1 - 5	Helped keep the team focused on the task 1 - 5	Contributed useful ideas 1 - 5	Quantity of work done 1 - 5	Respected team members' ideas 1 - 5	
1							
2							
3							
4							