

## Characteristics of Good Team Players

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### Abstract

Working in teams, especially on multidisciplinary projects, is becoming more and more common in engineering as well as in other work environments. However, despite the importance of “team-work” in engineering, there is little data on the characteristics of “good” and “poor” team players. This paper presents preliminary results from an ongoing, horizontal study of this issue in two engineering design courses, one at the sophomore level and the other at the senior level. The courses are offered each fall and spring and results contained in the paper are based on the documentation obtained from 214 students working on 57 project teams for the 2002-3 academic year. Individual demographic, academic, personality (Myers-Briggs type indicators) and personal data, as well as interest and skill level, were gathered from the four classes. The data for those individuals judged (by a peer evaluation) to be above average team players and those judged to be below average team players were then compared both to each other and to the class averages. The conclusions reached are listed below:

- The better team players were older with more work experience and more engineering related work experience.
- The poor team players were younger with less work experience and less engineering related work experience.
- The better team players tended to have better drawing abilities and were better self-critics of their own drawing abilities.
- Factors appearing to have little influence were personality type, gender, and high school and college grade point averages.
- The expressed motivation for the course or for working in teams and interest in the project seemed to have little influence on ones own performance on the team.
- Issues related the ethnicity and SAT scores are discussed but no conclusions are presented.

### Introduction

With all the interest in having our engineering students become good “team players”, there is a surprising lack of information in the engineering education literature on the

characteristics of these good “team players.” There are several methods and/or criteria used (See Dutson<sup>1</sup> for a short review.) by which engineering student teams are formed: by similar interests, by diversity of interests, by mix of personalities, by similarity of personalities, by diversity of skills, by academic diversity (high and low gpas), by diversity of work experience, by lot, and by student choice. However, while these studies do provide some evidence of a variation in team success as a function of team make up, none offers information which identifies the characteristics of the individuals who are judged to be the “good” team players by his/her peers. There are a few studies that actually evaluate team performance of “real” teams. Brickell, et al.<sup>2</sup> looked at the issue of the student’s gpa and interest. They formed five sets of teams: Four sets with the commutations of homogenous and heterogeneous gpa and interest and one control set. They concluded that teams with heterogeneous gpa and homogeneous interest performed best. Although this result is intuitively acceptable, the opposite grouping (homogeneous gpa and heterogeneous interest) was second best with essentially the same team rating (87.7 to 87.5 with variances of 0.09 and 0.17, respectively). Hunkeler et al.<sup>3</sup> provide a more convincing study of the effects of individual characteristics on team performance. They concluded that: 1) four person teams outperformed three person teams, and 2) the inclusion of academically outstanding students and students with practical experience increases performance. They had hoped to draw some conclusions regarding the effect on team performance of the mix of Kolb Learning Styles in the teams, but the distribution of learning styles in the student sample was too skewed. The Myers-Briggs Type Indicators (MBTI) are discussed by McCaulley<sup>4</sup> as related to success in working in engineering and design teams. She points out the theoretical desirability of having a diverse set of indicators represented on a design team and the fact that N (intuition) and to a lesser extent I (introversion) and P (perceptive orientation), which support creativity, would be desirable characteristics for the design team to have. On the other hand, the engineering education literature indicates that “introverts typically outperform extraverts, intuitors outperform sensors, thinkers outperform feelers, and judgers outperform perceivers.”<sup>5</sup>

The author of this paper has been teaching the required sophomore design course in the Department of Mechanical Engineering for the past thirteen years and has recently become involved in the teaching of the College of Engineering’s capstone design course which is taken by the seniors in three departments (Electrical and Computer, Industrial, and Mechanical Engineering). Both courses are project courses in which students work in teams of four. The students have always (22 years for the sophomore course and at least 35 years for the senior course) self-selected to form their teams. There are options to allowing teams to self-select, but, as noted above, the literature provides little help. Thus this project to identify the characteristics of good and poor team players is the first step before addressing the more important issue of determining the makeup of a good team.

## **Methodology**

The plan was to gather as much data as seemed relevant from each student enrolled in each class in the sophomore and senior design courses for the fall 2002 and spring 2003

semesters, to conduct a peer evaluation within each team, to organize the individual student characteristics according to the quality of his/her team “citizenship”, and then to see what sense could be made of all the data. That plan was followed and some meaningful conclusions made.

All students in both classes completed 1) the questionnaire in Fig. 1 (which requests demographic and personal data as well as the students’ opinions on nine statements about themselves and the course) , 2) a Keirsey Temperament Sorter<sup>6</sup> (which was used to determine MBTIs), and 3) a peer rating form taken from and explained in reference 7. (The peer rating scheme was first proposed by Brown<sup>8</sup> and is called the autorating method. The study described in the Kaufman<sup>7</sup> paper showed “that most of the concerns frequently raised about peer ratings...may be unfounded, with a possible exception being the potential influence of personal prejudice...” ) The students also provided a drawing sample. (Students were instructed to draw a three-dimensional sketch of an object given two views.) Sufficiently complete records were obtained from 214 of the total of 230 students initially registered for the four classes. This represented data from 84 of the 94 initially registered for the sophomore design course, and from 130 of the 136, for the senior design course. The grade point average and SAT score data were self reported (see Fig. 1) and were not verified. (An attempt was made to verify gpa and SAT scores, but the University’s policies and a lack of good record keeping rendered this attempt unsuccessful.) The SAT data were approximately 70% complete. Only the University of Houston grade point average (current UH gpa in Fig. 1) and the high school grade point average (high school gpa in Fig. 1) were used in this study. The reporting of the other grade point averages was very inconsistent and based on written comments from the students, was unreliable. There was a 90% reporting rate on the UH gpa. (Most of those not reporting were in the sophomore design class and were in their first semester at UH). The reported high school gpas are also suspect but were reported at about a 75% rate. (A significant number of the students did not attend high school in the USA and several had not seen the inside of a high school for many years.) A total of 57 teams were formed in the four classes.

The peer evaluations were used to provide a basis from which to identify the “good” and “poor” team players. The autorating method asks students to rate their team members on a qualitative scale based on their team citizenship, i.e., how well each member fulfilled his responsibilities to the team. The students are told not to rate their teammates on academic ability or on their total contribution to the project, but simply whether or not or to what degree they did what was expected of them. The rating of each team member is then compared to the team average rating and an individual (quantitative) ranking is determined with some students possibly above or below average in each team. (See reference 7 or 8 for a detailed description of the instrument and the analysis.) These results were then examined by the instructor. The instructor had worked closely with all teams in the sophomore design class and was not surprised by any of the results. The three instructors for the capstone course had each monitored one third of the teams and had a good idea who the “good” and “poor” players were. The three instructors met at the end of the semester to determine if team grades would be modified before being “given” to the individual team members. Again there were no surprises. However, the results for

Team number or name: \_\_\_\_\_

Individual name \_\_\_\_\_

1 Age (in years) \_\_\_\_\_

2 Ethnicity: Hispanic, Caucasian, African-Am, East Asian, Asian, other \_\_\_\_\_

3 Sex M or F

4 Work experience (effective years) \_\_\_\_\_

5 Engineering related work experience (years) \_\_\_\_\_

6 Equivalent full time college experience  
(years or approximate hours completed) \_\_\_\_\_

7 High school gpa \_\_\_\_\_/4.0

8 College Board Standard Aptitude Test

Verbal \_\_\_\_\_/800

Analytical (Math) \_\_\_\_\_/800

9 Estimated college gpa \_\_\_\_\_/4.0

10 Overall UH gpa \_\_\_\_\_/4.0

11 Science/engineering related gpa \_\_\_\_\_/4.0

12 Non-science/non-engineering gpa \_\_\_\_\_/4.0

13 Academic Major \_\_\_\_\_

Please respond to the following statements indicating the degree to which you agree or disagree with each.

	definitely not	no	neutral	yes	definitely yes
14 I was looking forward to taking this class					
15 I am enjoying (or expect to enjoy) this class					
16 I like working in teams					
17 I like working in MY team					
18 I would change teams if I could					
19 I think my team is working effectively					
20 Learning to work in teams is important					
21 I have experience with hand and power tools					
22 I have above average drawing skills					
23 Please add any comments regarding your special skills that make you more likely to succeed in this design class: _____					
_____					

Figure 1: Demographic Questionnaire

one dysfunctional team were discarded from this study when it was seen that each of two members who could not get along all semester had each managed to align himself with one of the remaining team members so that each faction provided a bimodal evaluation in which they rated themselves very high and the other two very low. With that one exception the ratings of the peer evaluation were used as submitted to determine the “good” and “poor” team players. Note that the team’s performance was not a factor in this analysis.

In the sophomore design class half of the semester grade is based on a two month-long “major project”. (For more details on this class see Reference 9.) For these two projects (one in each sophomore class) each team had given a team oral presentation, tested their artifact twice for the instructor, had three formal meetings with the instructor during which team members were questioned, had several informal meetings with the instructor, had some phone conversations with the instructor and had numerous email exchanges with the instructor. So even without the peer evaluations, most of the “good” and “poor” team players were already identified as noted previously. In any event, with some level of subjectivity twenty-nine “good” team players and twenty-two “poor” team players were identified for the sophomore design classes. For the senior course approximately 80% of the grade is determined from the team’s performance on one semester long project. This grade was based on a series of submissions throughout the semester that include individual oral and written assignments for each student. In addition, there are required team meetings with the instructors, questioning during the oral presentations and the poster session, and a final “project defense” in which individuals are asked to state and justify certain design decisions. (See reference 10 for details.) Through a process similar to that described above for the sophomore class, thirty-five people were identified as “good” team players, and twenty-one, as “poor”.

Therefore, for the four classes that totaled 214 students for which there was sufficient data, sixty-four or thirty per cent were judged to be good team players and forty-three or twenty percent were judged to be poor team players. The remaining 107 or fifty percent of the students were judged to be average team players. Table 1 summarizes the demographic, personality, and personal data, and Table 2 summaries the questionnaire data from the four classes.

## Results

The total population is over two hundred (214), but the population of the “poor” team players team is only 43 and only three of the five ethnic categories have populations greater than 20, so any ethnic related conclusions are still preliminary. There are five sets of data given for each category of team player in Table 1: one set for each class and the combined set. For the most part it makes sense to consider the combined set since the population is larger. However, in some cases it will be useful to consider the data from the individual classes when it appears that an issue might actually be treated differently between seniors and sophomores, e.g., age, gpa, and work experience.

	All Students					"good" Team Players						"poor" Team Players						
	So	So	Sr	Sr		So	So	Sr	Sr		So	So	Sr	Sr				
	f02	s03	f02	s03		f02	s03	f02	s03		f02	s03	f02	s03				
N	48	36	44	86	214	16	13	13	22	64	12	10	6	15	43			
	n	n	n	n	n	%	n	n	n	n	%	n	n	n	n	%		
<b>Ethnicity</b>																		
Caucasian	23	14	11	21	69	<b>32</b>	8	9	5	6	28	<b>44</b>	3	2	1	2	8	<b>19</b>
Hispanic	14	8	11	27	60	<b>28</b>	5	3	2	8	18	<b>28</b>	3	1	1	4	9	<b>21</b>
Asian	8	8	15	27	58	<b>27</b>	2	1	3	7	13	<b>20</b>	4	3	3	7	17	<b>40</b>
AfAm	1	3	5	11	20	<b>9.4</b>	0	0	1	1	2	<b>3.1</b>	0	2	1	2	5	<b>12</b>
Other	2	3	2		7	<b>3.3</b>	1	0	2	0	3	<b>4.7</b>	2	2	0	0	4	<b>9.3</b>
<b>Gender</b>																		
Male	33	26	33	71	163	<b>77</b>	9	9	10	19	47	<b>73</b>	10	7	5	9	31	<b>72</b>
Female	15	10	11	15	51	<b>24</b>	7	4	3	3	17	<b>27</b>	2	3	1	6	12	<b>28</b>
<b>Personality: Myers-Briggs: data in per cent</b>																		
Extraversion	57	80	59	65		<b>64</b>	53	75	57	68		<b>63</b>	59	86	33	50		<b>59</b>
Sensation	51	50	64	69		<b>61</b>	46	33	69	64		<b>54</b>	45	43	83	79		<b>62</b>
Thinking	65	63	69	78		<b>71</b>	56	75	81	86		<b>75</b>	63	50	67	58		<b>59</b>
Judging	84	78	83	90		<b>85</b>	87	79	77	100		<b>88</b>	59	86	92	93		<b>82</b>
<b>Personal Data</b>																		
						<b>avg</b>						<b>avg</b>						<b>avg</b>
Age (yrs)	21.6	23.4	24.3	25.1		<b>23.6</b>	22.5	24.5	25.5	26.2		<b>24.7</b>	21.1	21.1	23.7	24.0		<b>22.5</b>
Work (yrs)	4.4	5.6	4.6	5.7		<b>5.2</b>	3.9	7.0	4.9	6.4		<b>5.6</b>	3.3	3.1	4.0	4.6		<b>3.8</b>
Eng'g Work (yrs)	1.0			2.1		<b>1.8</b>		1.7		3.0		<b>2.5</b>		0.4		1.2		<b>0.9</b>
HS gpa	3.5	3.3	3.4	3.5		<b>3.4</b>	3.7	3.2	3.2	3.4		<b>3.4</b>	3.3	3.1	3.1	3.7		<b>3.4</b>
college gpa	3.0	3.0	3.1	3.0		<b>3.0</b>	3.4	3.1	3.0	2.9		<b>3.1</b>	3.0	3.2	3.1	3.0		<b>3.1</b>
SAT Verbal	503	576	510	536		<b>530</b>	527	645	526	587		<b>571</b>	503	585	403	548		<b>524</b>
SAT Anal	620	649	683	630		<b>642</b>	637	685	644	587		<b>631</b>	667	690	700	657		<b>673</b>

Table 1: Summary of the Ethnic, Gender, Personality, Personal Data for All Four Classes for All Students, Good Team Players, and Poor Team Players

Questionnaire Responses: 5=strongly agree; 4=agree;															
3=neutral; 2=disagree; 1=strongly disagree															
All Students					"good" Team Players					"poor" Team Players					
	So	So	Sr	Sr		So	So	Sr	Sr		So	So	Sr	Sr	
	f 02	s 03	f 02	s 03		f 02	s 03	f 02	s 03		f 02	s 03	f 02	s 03	
N	48	36	44	86		16	13	13	22		12	10	6	15	
	avg					avg					avg				
I was looking forward to taking this class.															
	4.36	4.00	3.64	3.82	<b>3.93</b>	4.25	3.58	3.69	3.67	<b>3.80</b>	4.09	3.71	3.50	3.71	<b>3.79</b>
I am enjoying this class.															
	4.23	3.80	3.64	3.89	<b>3.90</b>	4.25	3.50	3.92	3.95	<b>3.93</b>	4.00	4.14	3.00	3.57	<b>3.74</b>
I like working in groups.															
	3.94	4.10	4.00	4.19	<b>4.08</b>	3.56	3.75	3.85	4.29	<b>3.91</b>	4.09	4.71	3.33	4.00	<b>4.10</b>
I like working in MY group.															
	4.13	4.20	4.28	4.36	<b>4.27</b>	3.81	3.83	4.31	4.48	<b>4.15</b>	3.73	4.71	4.17	4.00	<b>4.11</b>
I would change groups if I could.															
	1.86	1.90	1.91	1.81	<b>1.86</b>	1.63	2.33	1.85	1.86	<b>1.90</b>	2.45	1.43	2.17	2.43	<b>2.17</b>
I think that MY group is working effectively.															
	3.98	3.80	3.95	4.16	<b>4.02</b>	3.88	3.17	4.23	4.19	<b>3.91</b>	3.86	4.43	3.67	3.71	<b>3.91</b>
Learning to work in groups is important															
	4.64	4.80	4.47	4.67	<b>4.64</b>	4.80	4.47	4.54	4.76	<b>4.67</b>	4.45	5.00	4.50	4.50	<b>4.60</b>
I consider myself a hands on person															
	4.31	4.10	3.63	4.30	<b>4.13</b>	4.50	4.17	4.54	4.30	<b>4.37</b>	4.09	4.17	4.00	4.36	<b>4.19</b>
I have above average drawing skills															
	3.40	3.20	3.49	3.44	<b>3.40</b>	3.50	3.58	3.53	3.38	<b>3.48</b>	3.36	3.14	3.33	3.38	<b>3.31</b>
The instructor's opinion on "This student has above average drawing skills,"															
	2.40	2.60	3.13	2.46	<b>2.61</b>	3.23	3.13	3.84	2.49	<b>3.08</b>	2.33	2.58	2.95	2.30	<b>2.46</b>

Table 2: Summary of Questionnaire Data for the Four Classes:  
for all Students, Good Team Players and Poor Team Players

### Ethic and Gender Issues

The demographics data are presented as three “pools”: the entire class, the “good” team players and the “poor” team players. The per cent (%) represents the proportion of each of these pools that the given category represents. For example, we can conclude that the Caucasian students appear to be better team players since they are the only team that appears in the “good” team players category more frequently (44%) than their appearance

in the class (32%) and in the “poor” team player (19%) less frequently than their appearance in the class.

The Hispanic students appear at the same rate in the class (28%) and in the “good team player” category but less frequently in the “poor” team player category (21%). Asian and African American students appear in the “poor” team player category at rates (40% and 12%) above their rates in the class and in the “good” team player category at rates (20% and 3%) below their rates in the class. Taken together the “minority” team players (non-Caucasian, non-Hispanic), represent 40% of the class, but only 28% of the “good” team players and 60% of the “poor” team players.

Another way to present the demographic data is illustrated in Table 3. This table tabulates the fractions of each ethnic category that were determined to be “good”, “average”, and “poor” team players. For example, 41%, 48% and 12% of the Caucasians were judged to be “good”, “average”, and “poor” team players, respectively, compared to the overall distribution of 30%, 50%, and 20%. If the non-Hispanics are grouped together, 21% , 48%, and 31% were judged to be “good”, “average”, and “poor” team players based on the 85 person sample. So while this group is likely to have about half their members “average” (as the Caucasians and Hispanics), they are half as likely to have “good” team players and twice as likely to have “poor” team players compared to the Caucasian-Hispanic group. The female sample is fairly small, but it appears that they are slightly more likely to be both “good” and “poor” team players than the males.

	N	"good"		"average"		"poor"	
		n	fraction	n	fraction	n	fraction
Caucasian	69	28	<b>0.41</b>	33	<b>0.48</b>	8	<b>0.12</b>
Hispanic	60	18	<b>0.30</b>	33	<b>0.55</b>	9	<b>0.15</b>
Asian	58	13	<b>0.22</b>	28	<b>0.48</b>	17	<b>0.29</b>
AfAm	20	2	<b>0.10</b>	13	<b>0.65</b>	5	<b>0.25</b>
Other	7	3	<b>0.43</b>	0	<b>0.00</b>	4	<b>0.57</b>
Male	163	47	<b>0.29</b>	85	<b>0.52</b>	31	<b>0.19</b>
Female	51	17	<b>0.33</b>	22	<b>0.43</b>	12	<b>0.24</b>

Table 3: Fractions of Each Demographic and Gender Groups in Each Team Player Category

## Personality

The Myers-Briggs Temperament Indicators, in and of themselves, do not appear to be useful predictors of an individual’s performance on a team. However, other research, e.g., references 4 and 5, indicates that the MBTI make-up on an individual team probably does have an effect



on the overall team performance. Based on the combined data, it does appear that intuition (opposite of sensation) and thinking indicate a slightly higher probability of a “good” team player.

### Personal Data

The effect of age on performance on a team is illustrated in Table 4. For each of the four classes the average ages for the class, for the “good” team players and for the “poor” team players are tabulated. Clearly age is a strong indicator. On average, the “good” team players are 2.2 years older than the “poor” team player and a year older than the class average. Note that the f 02 sophomore class design class was a morning class; the s03 class was an evening class which may account for the higher average age in the spring.

	so f02		so s03		sr f02		sr 03	
	age	diff	age	diff	age	diff	age	diff
class avg	21.6		23.4		24.3		25.1	
"good" avg	22.5	0.9	24.5	1.1	25.5	1.2	26.2	1.1
"poor" avg	21.1	-0.5	21.2	-2.3	23.7	-0.6	24.0	-1.1
difference: good - poor		1.4		3.4		1.8		2.2

Table 4: Average Ages and Difference from these Averages for “Good” and “Poor” Team Players. (All data in years)

Perhaps as expected, more work experience increases the probability of a person being an effective team member (Table 1). The “good” team players averaged almost two years more general work experience and 1.6 years more engineering related work experience than the “poor” team players. (Work experience was added to the questionnaire for the spring.) An interesting result is related to the SAT scores. The “good” team players actually had analytical scores slightly below the class as a whole, but their verbal scores were significantly above the class average. When compared with the scores for the “poor” team players, the verbal scores for the “poor” team players are considerably below the “good” players (524 to 571), but their analytical scores are significantly higher (673 to 631). The class averages were 530 (verbal) and 642 (analytical).

High school and college gpas appear to have no value in predicting “good” or “poor” team behavior.

### Questionnaire Results

These data (Table 2) are perhaps best examined on ones own, but the following comments seem appropriate:

- The sophomores seem considerably more enthusiastic about their course than the seniors, but there is not any difference in enthusiasm between the “good” and “poor” team players.
- The “poor” team players appear to be enjoying these particular classes a little less than the class as a whole and the “good” team players.
- The “poor” team players seem to like working in teams more than the “good” team players.
- The “poor” team players are a little more anxious to change teams.
- All agree that learning to work in teams is very important.
- As others<sup>3</sup> have noted, “hands-on” experiences seem to improve ones effectiveness in a team.

### **Drawing and Critique Skills**

One of the more interesting findings of this limited study is the potential use of drawing or sketching skills in identifying “good” team players as evaluated by a third party (the last row in Table 2). Further, it is clear that the student’s perception of his/her own skills in this area cannot be relied upon and in fact may also be used as an indicator of teaming skills. Note the difference between the last two entries in Table 2. The students were asked to assess their own drawing skill (“I have above average drawing skills.”). The two classes responded similarly: 3.33/5.0 and 3.46/5.0 (These are student weighted averages.) indicating a weak “agree.” However, the instructor’s evaluation of a drawing samples resulted in a weak “disagree” (2.61) for the four classes. The final and perhaps most interesting result is then that the “good” team players were also the more realistic critics of their own work. Note that for the “good” team players the self evaluation of their drawing skills and the instructor’s evaluation of their skills were closer (3.45/5.0 to 3.08/5.0) than they were for the same comparison for the “poor” team players (3.31/5.0 to 2.46/5.0). This issue is discussed further in the Discussion Section following.

### **Discussion**

The purpose of this study was simply to gather data concerning an issue for which little had been published, at least in the engineering education literature. Any conclusions are at best only preliminary due to the limited sample size and possibly the research methods.

However, it does appear clear from this data, and logical even without the data, that maturity (as illustrated by the better team performance by the older students and those (maybe the same students) with more work experience) plays a key role in ones ability to work effectively on a team.

The results from the four classes consistently indicate higher SAT Verbal scores and lower SAT Analytical scores for the “good” team players compared to the “poor” team players. These results are suspect, however, since the SAT scores are probably the least reliable of the input variables. Also, this result may simply be a reflection of the fact that a large fraction of the “poor” team players (40%) were Asians, who usually do well in mathematics but tend to have (English) language difficulties.

The implication that the “white majority” (Caucasians and Hispanics) seem to do better in team situations than the “non-white minority” could be due to a variety of reasons. Historically the Caucasian and Hispanic cultures have assimilated each other to a large extent, especially in Houston. The other ethnic groups are not as well assimilated with the “majority” due to historical issues (Asian, African American, and Middle Eastern) and newness (Asian and Middle Eastern, at least in Houston). Also, because the minority cultures simply have fewer representatives in the class, the minority student is more likely to be in the minority on his/her team and therefore must deal with potential majority-minority issues more often than the majority student does (but this issue must also be handled by females). Finally, “personal prejudice” by another may play a role in ones ability to function effectively on a team as well as effect the peer evaluations<sup>7</sup>.

Drawing ability and the ability for honest self criticism were consistently valid discriminators between “good” and “poor” team players. This fact can be verified (as noted above) by comparing the evaluations of the drawing abilities of the “good” and “poor” team players for each class in the last row of Table 2 and comparing the data, column by column, between the last two rows in Table 2, respectively. In total, the difference between the drawing abilities of the “good” team players (3.08/5.0) compared to the “poor” team players (2.46/5.0) was the largest (0.52/5.0) for all the issues addressed in Table 2. (Perhaps there are better discriminators but they have not been tested yet.) Further, the cumulative difference between the self evaluations by the “good” team players compared to the third party evaluations and those of the “poor” team players compared to those of the same third party was almost as large (3.48 compared to 3.08 and 3.31 compared to 2.46 or comparing the two differences: 0.40 and 0.85) at 0.45/5.0. More developed skills at drawing and in critical analysis (The assumption is being made that the ability for honest self-criticism represents an ability for critical analysis in a more general sense as well.) may not be the fundamental abilities that lead to better team citizenship. However, they appear to represent at least the manifestation of such ability. As a personal observation, the better artists work harder and are less likely to be satisfied with their work. These traits are beneficial in a team environment. However, it is true that these traits may also manifest in ways other than through skills in drawing and critical analysis.

Perhaps even more interesting than those factors that seem to contribute ones teaming abilities is the apparent lack of influence of several other issues that have been suggested in the past as being influential, e.g., gender, personality type, academic success (other than SAT scores) and the student’s attitude related to the course and team projects.

## **Conclusions**

An attempt has been made to identify the desirable characteristics of “good” team players. Some of these results may have been correctly anticipated. For example, older, students with more work experience are better candidates for “good” team players. Perhaps surprising was that personality indicators, i.e., MBTI, attitudes toward the course and project work in general, and past academic successes as measured with grades

seemed to have little correlation with an individual's team citizenship. All the students very strongly agreed that working on teams is important and almost as strongly seemed to enjoy the opportunity to do so. It was determined that the ability to express oneself through drawing and to perform valid critical self analyses may be skills, or at least the manifestation of the skills, associated with working successfully in a team environment.

## Recommendations

The point of this paper is not simply to single out demographic information or skill levels as being more or less likely to produce "good" or "bad" team players, but rather it is to establish that there are differences in "teaming" ability. The first step in correcting the problem of non-optimal teaming ability is to identify the deficiency. We do not limit the admission to our programs based on age, ethnicity, gender, and/or work experience, so there is little we can do to change the makeup of our students. However, based on very limited data, we can be watchful for individuals and teams that appear to be at risk. For example, simply discussing the issues associated with good team citizenship with the class, providing training in developing teaming skills, being watchful for young and/or minority students, and having a willingness to intervene in a team if needed would all be helpful.

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## **Biography**

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Richard Bannerot is a Professor of Mechanical Engineering at the University of Houston. His research interests are in the thermal sciences and in engineering design education. For the past twelve years he has taught the required "Introduction to Design" course at the sophomore level and has recently become involved in the teaching of the college's capstone design course. He is a registered engineer in the state of Texas.