Session 2230

Personality and Teaching /Learning Engineering

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How do people prefer to learn? Is it possible that grades are awarded based upon personality, rather than ability? Are some personality types "weeded out" of engineering because they are different from professor personalities? How closely do engineering professor personalities match those of practicing engineers?

Questions like the above were of concern to ASEE, particularly the Education, Research, and Methods (ERM) Division, who subsidized a 1980 study of 3,718 students in eight engineering schools[*]. In this ERM historical perspective session, similar studies over the previous twenty years suggest that the results may not be very time-dependent.

The Instrument. C.G. Jung[1] first described personality types, as later developed into the Myers-Briggs Type Indicator[2] or MBTI, a testing instrument. While only a brief (and admittedly loose) classification is given here, complete descriptions are available[2,3,4]. The MBTI suggests personalities differ on the following dimensions:

1. Preference for dealing with the outside world (Introversion/Extroversion). If one derives pleasure from dealing with numbers of people, or from in-depth reflections he/she may be termed an Extrovert (E) or Introvert (N) , respectively.
2. Preference for Taking Data. Whether a person pays great attention to detailed data, or prefers to make giant leaps, connecting "sketchy" dots to obtain a picture, he/she is typed as a Sensing (S) or Intuitive (N) type, respectively.
3. Preference for Making Decisions. If a person decides based upon "cold hard facts", or if decisions are based upon empathy for others, he/she is typed as Thinking (T) or Feeling, (F) respectively.
4. Preference for Taking Data or Making Decisions. Whether one enjoys taking data and leaving options open for creativity, or making decisions rapidly and getting many things done, determines the Perceptive (P) or Judging (J) dimension.

The above four categories, each with two choices, provide 16 combinations of personality types. Differences in the 16 personality types are considered in references[3,4] , dealing with various disciplines.

Test Results: Table 1 summarizes percentages of engineering students in the above four catagories for the 1980 study (as well as two earlier studies) as compared with general freshmen personality types. The table is remarkable in two aspects: (1) the similarity of results of the three engineering studies and (2) the differences of engineering students from the general college student population. The Table 1 data suggest the engineering student population contains many more introverts, thinking, and judging types than the general college freshmen, while they seemed to roughly match on the sensing/intuitive dimension (except the 1962 sample, in which engineering students were more intuitive).

[*] U. Alabama, Clemson, U., Cleveland State U., Colorado School of Mines, Cooper Union, U. Floriday, U. Houston, Indiana U. Purdue U. at Indianapolis

However the percentage of intuitive engineering students was proportional to entering SAT scores, but inversely proportional to the maturity of the engineering discipline.

Table 1. Type Comparison of Engineering and Other College Students

Type/Population	College Freshmen[6]	1962 Engin.[2] Students	1976 Engin.[5] Students	1980 Engin.[6] Students
Sample Number	11,122	2,389	1,060	3,718
Introverts (N),%	44	52	62	54
Sensing (S), %	56	33	52	53
Thinking (T),%	33	68	59	74
Judging (J),%	47	64	60	61

Data such as the above have diverse and far-reaching implications. As one example in a smaller sample, engineering faculty and student testing[7] indicated the largest difference was in sensing/intuition, which alarmingly has the largest bearing on learning (how do people prefer to take data). More than three-quarters (77%) of an engineering faculty was intuitive (N), with a teaching style which prefers concepts, supported by only a few examples. In contrast about half (46%) of students were sensing – a learning style which prefers multiple examples in order to learn a concept. Sub-optimal learning will result when faculty prefer to teach in ways contrasting the preferred student learning styles.

Conclusion. The MBTI was shown to be a remarkably reproducible tool to determine the engineering student personality. Applications can be found in such diverse areas as (1) composing diverse groups for design, (2) problem solving, (3) studying retention, (4) awarding grades based upon personality (5) contrasting teaching and practicing engineering personalities, etc. Interested readers may wish to consider the bibliography.

Bibliography

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Biographical Information

E. Dendy Sloan, Jr. is Weaver Distinguished Professor of Chemical Engineering at the Colorado School of Mines. He has served as Chairman of both the Education, Research and Methods Division (1983-5) and the Chemical Engineering Division (1985) of ASEE. For the last decade he has been Publications Board Chairman for the journal Chemical Engineering Education.