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Good Teaching: As Identified by Your Peers

Abstract:

The literature on teaching is replete with definitions and examples of good teaching. They include the traits and characteristics of the best instructor/teacher/professor. They have examples of methods and results of surveys that quantify teaching: bad or good. In recent years, the literature included the impact of teaching on the student learner; thus, coming full circle, from teacher to learner. The literature provides good information, but it is the analysis of the current classroom experience of one's peers that provides reliable information on the teaching of today's students.

Since 1998, over 1000 faculty have pondered over 5 questions concerning good teaching. They have pair-shared the results and those results accumulated. Collectively they defined good teaching; the methods, the results and measures and the need for good teaching to ensure that classes and courses are successful. They even discussed the definition and meaning of successful. They have assigned adjectives and phrases as exemplars for the best practices of instructors/teachers/professors.

This paper will discuss the results of the discussions on good teaching. It will tie the results of faculty discussions with the literature and the voice of students who have discussed good teaching with Educational Psychologists. It will show that the fundamentals of good teaching are simple and attainable by every faculty member and it will frame a few of the most important traits and characteristics that the best instructors/teachers/professors possess.

The Literature:

Skilling [1] begins his book: *Do you teach? Views on college teaching*, with the "Eleven Commandment for Teachers." He states that, "The good teacher likes his students and enjoys helping them, understanding their thoughts and feelings. You [the good teacher] should:

1. Remember the students whom you teach, for they alone are a measure of your success.
2. Forget yourself, for your own excellence is good only as it helps your students.
3. Consider the purpose of your teaching, and show the student a goal as far ahead as you both can see.
4. Accept him as he is and improve him as you can; the student is guided by intellect but driven by emotion – to complain is futile, and to ignore his motivation is to fail.
5. Show him the real world of fact for interest and the ideal world of theory for understanding, each illuminating the other.
6. Relate new thoughts to what the student knows, for this is how he learns; lead him from the known to the unknown.
7. Repeat and repeat, yet never the same; let each idea be seen three times in different lights.
8. Let the student work, for work is remembered long after words are forgotten. Hearing is weak, seeing is better, doing is best.
9. Let the student seek; lead him to discoveries of his own, and these will be his choicest jewels of knowledge.
10. Provide light and air and quiet, for all work is lost if attention fails.
11. Know thoroughly the subject that you teach, and where it leads; present it with interest and enthusiasm."

This advice, written in 1969, reveals a time when Professor Skilling's students were predominantly males and expectations and results were undoubtedly different from those of

today's students. There are several pearls of wisdom here that can be summed in few words: goals (objectives), motivation, interest, enthusiasm, knowledge, and purpose. The teacher must understand the purpose of the course and set objectives; the teacher must know the material thoroughly; the teacher must motivate the students; and the teacher must present the material with interest and enthusiasm. Good advice, even in the classroom of today.

Like Skilling, Lowman [2] begins *Mastering the Techniques of Teaching* with a chapter on exemplary teaching. He categorizes teaching as a two-dimensional model: dimension one being intellectual excitement; dimension two dealing with interpersonal rapport. He states that: "Exemplary instructors, then, are those who excel at one or both of these dimensions of teaching effectiveness, and who are at least adequate in the other." Intellectual excitement can be divided into two components: "...the clarity of the instructor's presentations and their stimulating emotional impact on students." Reduced to basics, it is how material is presented and how involved the students are in learning the material. Good presentations engage the students resulting in attention without distraction. Interpersonal rapport, "...deals with an instructor's awareness of these [classroom] interpersonal phenomena and with his or her skill as communicating with students in ways that increase motivation, enjoyment, and independent learning." There are two keys – "...avoid stimulating negative emotions" and "...to promote positive emotions."

Lowman's model grew from an analysis of over five hundred teaching award nomination forms submitted predominantly (80%) by students. The analysis resulted in descriptors that applied to the model. The table below is a reproduction of a table from his book: note that only descriptors mentioned more than ten times were included.

Descriptors Associate with the Enhanced Two-Dimensional Model of Effective College Teaching [2]

Dimension I: Intellectual Excitement			
Adjective	Appearances	Adjective	Appearances
Enthusiastic	68	Engaging	18
Knowledgeable	45	Prepared	16
Inspiring	43	Energetic	15
Humorous	34	Fun	13
Interesting	31	Stimulating	13
Clear	25	Creative	12
Organized	22	Lectures well	11
Exciting	22	Communicative	10

Dimension II – A: Interpersonal Concern			
Adjective	Appearances	Adjective	Appearances
Concerned	45	Approachable	12
Caring	33	Interested	12
Available	27	Respectful	11
Friendly	18	Understanding	11
Accessible	17	Personable	10

Dimension II – B: Effective Motivation			
Adjective	Appearances	Adjective	Appearances
Helpful	41	Demanding	14
Encouraging	29	Patient	13
Challenging	28	Motivating	11
Fair	19		

Commitment to Teaching			
Adjective	Appearances	Adjective	Appearances
Dedicated	35	Committed	19

General Positive Descriptors			
Adjective	Appearances	Adjective	Appearances
Effective	17	Outstanding	14
Excellent	17	Great	10

There are some word overlaps (motivating/inspiring, interest, enthusiastic, knowledgeable) with Skilling that begin to form a pattern of adjectives that are synonymous with student's ratings of teachers. Wankat and Oreovicz [3] in *Teaching Engineering*, discuss the components of good teaching with a greater focus on engineering faculty. Wankat and Oreovicz, commenting on good teaching, use some of the same "overlapping" adjectives including: "stimulating, clear, well-organized, warm, approachable, prepared, helpful, enthusiastic and fair." They also agree with Loman's two-dimensional model further adding that: "The most important dimension is intellectual excitement which represents the teacher's "obligation to knowledge and society" (Elbow, 1986, p. 142)." Being engineers, it is thought that intellectual excitement is the most important aspect of teaching and that this fits the wisdom of the profession. Further they state: "Included in intellectual excitement are organization and clarity of presentation of up-to-date material. Since dull performance can decrease the excitement of the most interesting material, this dimension includes performance characteristics." In a series of questions that follow this comment, they highlight performance characteristics that include: energy, enthusiasm, love of material, clear and articulate language, and active engagement of students. The trend of "overlapping" adjectives and phrases continues.

Concerning interpersonal rapport, Wankat and Oreovicz claim that it "...is the teacher's "obligation to the students" (Elbow, 1986, p. 142)." They further discuss the notion that engineering professors do not necessarily agree that interpersonal rapport is important: however, "...students consistently include this dimension in their ratings of teachers." So, believe in it or not, interpersonal rapport is part of the scheme by which faculty are judged. Further, Wankat and Oreovicz add a new twist to the interpersonal rapport discussion by including the notion of a punishing type of relationship with students. Here, faculty members are "attacking, sarcastic, disdainful, controlling, and unpredictable." They imply that students who fear their professors get the job done but do not retain the material and do not excel in the subject area. As a group, those professors who act in a punishing manner are unprofessional and receive the lowest evaluations among their peers. They go on to add that those faculty members who maximized the combination of intellectual excitement and interpersonal rapport were highly regarded as teachers. This is a conclusion that just makes sense, but that needs to be stated so that engineering faculty members can recognize the worth of the Two-dimensional model.

Estes and Ressler [4] in discussing the ExCEED teaching model state: "The ExCEED model recognizes both the need for structure and organization as well as rapport with students and an enthusiastic, engaging presentation." More "overlapping" adjectives are mentioned from one of the faculty development programs sponsored by ASCE. They have a list of the do's and don'ts for effective teaching and suggest that faculty members who follow the list are probably those who teach well.

Gaonker [5] discusses a feedback model for new educators that includes the first four practices of good teaching as described by Chickering and Gamson. He states that: "If teaching effectiveness is to be evaluated or judged by learning, we should focus primarily in the feedback path." His feedback path is evaluated using the first four practices:

1. Encourages contact between students and faculty – (interpersonal rapport)
2. Develops reciprocity and cooperation among students – (intellectual excitement)
3. Encourages active learning – (intellectual excitement)
4. Gives prompt feedback – (intellectual excitement and interpersonal rapport)

The parenthetical statements indicate the possible impact of the feedback mechanism with regard to Lowman's two-dimensional model.

The Discussions:

Over the past ten years workshops were held to assist faculty in the development of better teaching skills. Like the ExCEED program, the Essential Teaching Seminars (ETS) or the 2004 version called ExCEED, sponsored by ASME, IEEE, AIChE and ASCE, focuses on the practice of teaching as outlined in the books by Lowman, and Wankat and Oreovicz, and the expertise of veteran teachers of varied backgrounds. At the beginning of each workshop, participants are asked to describe good teaching practices via the following questions:

1. What is good teaching?
2. How is it accomplished?
3. Is good teaching necessary to have a successful course?
4. How is it evaluated?
5. What are the results of good teaching?

As can be imagined, there are hundreds of answers to these questions. In the paragraphs that follow, the most repeated answers will be listed just as the adjectives were listed by Lowman. A small sampling of the responses from the last eight ETS workshops (approximately 25% of the total participants) is provided. At each workshop participants are divided into groups to answer the questions and their responses are provided to the group where additional comments are solicited. The responses are listed below and are accompanied by a brief analysis for 4/5 questions: number 2 being considered separately. When addressing number 2, the method for accomplishing good teaching, the responses are listed under the "corresponding" category of the two-dimensional model in an effort to come full-circle in the analysis of what makes good teaching. It is important to realize that the answers to some of the five questions are more student-centered than either Skilling or Lowman portray in their works. However, the adjectives they report were provided by the students and the results portrayed here are from the teacher's perspective – the "overlap" will become obvious. Finally, there will be a brief discussion of the results and any surprises that have occurred

What is good teaching?

The responses listed in Table 1. include some that could be included in the other tables, but are left in the summary of good teaching to highlight the opinions of the group. Many of the responses focus on the "duties" of the teacher, some are responsibilities of the student and others represent classroom tactics that apply to both the teacher and the students. Careful analysis identifies some of the adjectives previously reported – the adjectives are highlighted for easy identification. Further analysis indicates that the teacher must: understand the student's learning styles, communicate expectations, motivate the students to perform through the use of various teaching styles and course flexibility, present the material in an organized manner, make the course relevant, and demonstrate methods that stimulate students to learn on their own, both in the course and throughout a lifetime of learning. There are elements of intellectual excitement and interpersonal rapport throughout, with more being said about these dimensions in the "how accomplished" section. It is clear that the teacher must teach and the students must learn. The latter focus on student learning is essential and must be addressed in the "evaluation" and "results" of good teaching sections.

Achieves student learning	Attract and keep student's attention
Addresses different learning styles	Communicate course content to students
Student satisfaction at some level (90%)	Achieve course outcomes
Students are engaged and challenged	Passionate about teaching
All students legitimately receive "A"	Adapts to audience
Actively engage students in learning	Flexibility in explaining information
Motivates students	Energy
Cognizant of learning styles	Engage and motivate the students
Shows applicability/connection to other courses	Effective communication with students
Engenders retention of knowledge (or students)	Cohesive and logical presentations
Students understand the basics	Mentoring and respectful relationship
Demonstrations	Good facilitation
Transmit a message	Accurate, technically correct
Continuous and organized presentation	Thought process
Like other things, you know it when you see it	Instill a desire to learn
Relevant	Facilitate and motivate
Promotes self learning	Interactive classes
Engages students	Constant assessment of learning
Identify student learning styles	Identify and address student's conceptual difficulties
Good organization and planning	

Table 1. Responses to "What is good teaching?"

How is it accomplished?

The simple answer is through a combination of the two dimensions of Lowman's model: intellectual excitement and interpersonal rapport. The responses in Table 2 are cumulative over the workshop series but reflect a good understanding of the need for engineering faculty to utilize both dimensions. Most of the workshops focused on intellectual excitement, yet all included elements of interpersonal rapport. It is refreshing that the faculty who participated in the process identified these factors as important to accomplishing the mission of teaching engineering. In the intellectual excitement column there is preparation, planning, technology, motivation, active, organization, enthusiasm and experience – all adjectives that lead to inspiring students to learn and be interested in the subject. In the interpersonal rapport column there is student involvement, teamwork, interaction, enthusiasm, communication, motivation, trust, connectivity, and student responsibilities – all adjectives and phrases that lead to a relationship between teacher and student. Teachers who use some number of these ideas have the opportunity to excel as teachers and be efficient in the classroom, thus providing more time for other important efforts such as research and scholarly production.

Intellectual Excitement	Interpersonal Rapport
Planning	Student involvement
In-class assessment	Flexibility/standards
Student motivation	Enforce discipline/standards
Integrate technology	Teamwork (students and teachers)
Adaptation of material presented to students learning style	Understanding learning styles
Involve the senses	Practice (students)
Engender student self-discovery process	Adapt to student learning styles
Feedback on student knowledge base	Make it fun
Focus on basics	Interact with students

Student understanding of concepts	Enthusiasm – entertaining skills
Preparation – logical organization of content	Effective communication
Preparation – Create clear expectations for students	Engage and motive students
Be active – keep moving	Variety of presentation methods
Hands-on experience to motivate students	Win students’ trust
Experience (teachers)	Stay connected with students
Get organized	Tailor teaching to the student’s level
Motivate students – get them excited about material	Convey student responsibilities
Vary the learning tools	
Project interest and enthusiasm	
Appropriate out of class assignments	
Challenging tests	
Practical – relevant examples	
Organized	

Table 2. Responses to “How is it accomplished?”

Is good teaching necessary to have a successful course?

The responses in Table 3 include “yes” and “no.” Behind this list are thoughtful discussions that are based upon the ability of students and the meaning of successful. Some argue that their students would learn successfully in the absence of good teaching. Others maintain that less qualified students need good teaching to have value added to their education. Next was the discussion of what successful means with definitions ranging from: all students understanding the material, all the way to good student evaluations that would satisfy university norms. The intention of this question was to elicit this kind of discussion. Success in the classroom should be measured by the level of student learning and their development as engineers. Is it necessary to have good teaching? The answer is that it helps in the process of making good engineering students great ones, and taking marginal students and making them solid engineers in their fields. There is no data to support this contention – except that the years of experience of excellent teachers and pages of writings on the subject suggest that good teaching leads to student learning.

To meet student expectations	Job security
Communicate and connect	Quality graduates
Assist in interpreting the text	Motivate students and create enthusiasm
Meet university expectations	Basis for student learning
Overcome distractions	Attract and retain students
Address learning styles	To reach students with academic challenges
Yes!	Adapt to class environment
Assist in understanding the textbook/material	Maintain attention
Increase retention of material	Cover difficult material effectively
Accomplish accreditation outcomes	Maybe yes, maybe no
Only part of the time	Better students learn in spite of teaching
Needed for optimal learning	To motivate students
To make class more enjoyable	Increases desire to learn
Depends on student’s backgrounds	Good teaching accompanies success
Good techniques assist learning	Value added
Depends on the definition of successful	Bridge between students and knowledge
Students gain knowledge and skills	What percentages of students succeed?
Success based on everyone accomplishing the objectives	Define success then outcome assessment to measure success

Table 3. Responses to “Is good teaching necessary to have a successful course?”

How is good teaching evaluated?

Table 4 indicates that good teaching appears to be evaluated via two different methods: the evaluation of the teaching itself and the evaluation of the student learning. Assessment or evaluation of teaching can be handled by a combination of students and peer evaluations. Both are cited by the workshop participants as necessary to have effective evaluation of teaching. McKeachie [6] in *Teaching Tips: Strategies, Research, and Theory for College and University Teachers* relates that student ratings are valid and can be used to improve classes and aid in the development of faculty. Further, he indicates that the peer evaluations are good, but their usefulness is overestimated due to the low number of visits. While good teachers do a fine job evaluating their peers there is an issue of consistency that must be addressed: an issue that can only be resolved through more frequent classroom visits. The remaining responses deal with the student's ability to learn and their actual learning in a classroom setting. The good teacher will evaluate this to some degree, but the real proof of good teaching is retention of knowledge and the student's ability to apply the material in future academic and workplace situations. These long and short term evaluations are the subject of pages of material on assessment techniques which will not be addressed here. It is sufficient to say that some method must be established to evaluate student learning and to reward teachers who can foster this in their classes.

Did they learn the material?	Assessment of how much students have learned and retained
Student engagement	Exams not adequate, but used (pre/post test)
Student enthusiasm and appreciation	Student evaluations
Was critical thinking improved?	Long-term retention of the material
Do students think they are good?	External peer evaluation of teaching
Rate the engagement of students in classroom	Enthusiasm/knowledge of teacher
Student learning	Proper metrics
Student engagement	Peer evaluations

Table 4. Responses to “How is good teaching evaluated?”

What are the results of good teaching?

It is interesting that in Table 5 the student are mentioned more often than any of the other tables. There are, of course, rewards for faculty who teach well: good student evaluations, respect from students and colleagues, and recognition by the University. But in the vast majority of the circumstance represent here, the winner is the student. The student becomes enthused with the material, performs better in class and throughout life, is happier, appreciates the field, is involved and confident, does well on standardized exams, and can think independently. All of these comments reflect on the development and maturation of the young engineer – the process from young student with a dream, to a student fully realizing her or his potential. This growth may occur naturally, but the value added by excellence in teaching surely has some impact on the rate of development and level of success enjoyed by the students who experience excellence teaching.

Enabling student judgment	Increased student enthusiasm
Mastery of the material	Added tools to the tool-box – value added
Good student evaluations	Instill a holistic view
Minimize effects of negative elements	Help evaluate/focus career objectives
Attracting students to follow-on courses	General improvement of student performance
Good evaluations from “C” students	Develop an appreciation for life-long learning
Subsequent application of concepts	Improve student evaluations of faculty performance
Enthusiasm and team participation	Success on National Std Exams

Students ask for more!	Challenge and accomplishment
Students can teach peers	Long-term technical competence
Ability to communicate well with students using technical jargon	Develop a personal investment in the learning process
Students are happy	Students have an appreciation for the field
Interest and motivation for further study	Students should see the application and relevance
Good evaluations	Improved student knowledge retention
Industry/academic preparedness	Students want to learn more
Life-long learning	Develop appreciation for instructor
Student confidence in what they do	Receive more useful student feedback
Student retention	Promotion and advancement
Student involvement	Enhance confidence level
Standardized exams	Become more fun
Good grades – demonstrated learning	Students perform better in future courses
Preparation for follow-on learning	Respect of students
Student engagement	Students think independently

Table 5. Responses to “What are the results of good teaching?”

To tie this discussion of the responses to the questions it is valuable to return to the literature. Wankat and Oreovicz developed a compendium of learning principles that include:

1. Guide the learner
2. Develop a structured hierarchy of content
3. Use images and visual learning
4. Ensure that the student is active
5. Require practice
6. Provide feedback
7. Have positive expectations of students
8. Provide means for students to be challenged yet successful
9. Individualize teaching style
10. Make the class more cooperative
11. Ask thought provoking questions
12. Be enthusiastic and demonstrate the joy of learning
13. Encourage students to teach each other
14. Care about what you are doing
15. If possible, separate teaching from evaluation

These principles are considered the best practices and “what works.” They are the basis of the book; *Teaching Engineering*, a highly regarded work that brings engineers into the classroom with excellent skills and provides the necessary tools to assist in student learning. In reviewing the list, it is apparent that they too believe in Lowman’s two-dimensional model. It is also apparent that the workshop participants have some idea about what it takes to be a good teacher.

Reinforcing Good Teaching

The discussions about good teaching occur at the beginning of a three-day workshop to frame the objectives of the workshop. Descriptors listed in Table 1 like: enthusiasm, energy, communication, organization, rapport, motivation and relevance are linked to teaching methods that are proven to be successful. These methods and the descriptors are constantly reinforced to illustrate their importance to good teaching. Participants demonstrate their brand of teaching in a mini-class that is evaluated by other participants and a mentor. This process identifies teaching methods that are exceptional and those requiring considerable attention. The participants have defined what good teaching should be and have discussed teaching methods that lead to good teaching, but some have not incorporated the methods into their teaching. During a second mini-

class many participants change their teaching methods and find that they are more satisfied with their class, and they find that their evaluations contain more of the good teaching descriptors. This learn and practice scenario is a process to reinforce what they know so that they can take this knowledge back to their classrooms.

Assessing the impact of the workshop is difficult, but many of the participants have provided anecdotal evidence that the process has been successful. One wrote that after returning to his classroom a student approached him and commented: "I don't know what you did while you were away the last few days but it has improved your teaching." One department head wrote that the workshop: "Had an immediate impact on the organization of the material presented and that the students noticed the improvement right away." While these two examples are shy of scientific evidence – they do illustrate that even faculty who know what needs to be done to make their classes better often do not incorporate these teaching methods until they experience them in a setting that provides feedback.

This result could be accomplished at every university across the nation if there were discussions on the topic of good teaching and if there were classroom evaluations conducted by good teachers to provide feedback to those in need. Mentoring of new faculty, and in some cases the more experienced faculty, could pay huge dividends in improving teaching, and in student learning. Like any other portion of the role of faculty, faculty members perform best in those areas emphasized by the organization.

Summary:

It is refreshing to note that the responses to the five questions from teachers with zero to 25 years experience result in data similar to that presented by the experts from many disciplines. It is more refreshing to note that the responses came from engineering faculty, many of who are just beginning to teach. With such an aware faculty cohort, many of whom are new to teaching, it is possible that the years ahead will see better results in the quality and quantity of engineering graduates. And even if the numbers of graduates remain the same, perhaps they will be more satisfied with their education than their predecessors.

It is important to note that a detailed study of the importance of teaching quality was reported on by Brawner, et. al. [7]. In their study, they revealed that the importance of quality teaching was rated very highly by the respondents, 6.5/7.0 and that colleagues, Department Heads, Deans and "top" Administrators rated the importance of quality teaching as 5.21/7, 5.58/7, 5.14/7 and 5.10/7 respectively. Unfortunately, their study indicated that the reward system for quality teaching at the institutions represented received a 3.71/7. They conclude that according to the respondents: "... the climate for teaching on their campuses was not particularly good in 1997 and worse in 1999. Most respondents expressed a belief that effective teaching (i.e., teaching that sets high but attainable standards, enables most students to meet or exceed the standards, and produces high levels of satisfaction and self confidence in the students) was very important to them and decreasingly important to their department heads, faculty colleagues, dean, and top university administrator." Their data supports what was found during the workshops, that the faculty members have the right idea about teaching and that there is a desire to fulfill the needs of the students by providing "good" or quality teaching.

Conclusions:

Good teaching can be achieved by the average engineering professor. There are some simple keys that will help in accomplishing the mission: plan, prepare, practice, organize, communicate, challenge, motivate, and lead the students to learning. The two-dimensional model is easy to use and appears to be in use because the newer faculty members are aware of it. Or, there is an excellent series of training courses that all of these faculty have attended, that have made them

aware of the methods. Frankly, I suspect that many faculty have just learned by watching teachers teach – deciding what made sense – what felt right – and vowing to be that kind of teacher. By attending workshops, their ideas about teaching are reinforced by the views of their peers. Thus we have identified good teaching through a peer identification process. Perhaps, all colleges should gather their faculty to discuss this very issue as it has great impact on the students, even if the university reward system does not recognize teaching as important. Most faculty must teach, and doing it well can be fulfilling and lead to efficiencies across the spectrum of teaching, research and service.

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