The role of teachers at university: What do high achiever students look for?

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Abstract: The perceptions of students about their teachers have interested the academic and scientific community, regarding the improvement of the quality of higher education. This paper presents data obtained from interviews conducted with ten high achiever engineering students and focuses on the characteristics of teachers that are highly valued by the participants. Furthermore, the influence of teachers on the development of the students was explored. The data collected describes a set of aspects from the scientific, pedagogic and emotional domains, which students identified about their teachers. Some reflections and practical implications are also presented with regard to the characteristics and pedagogical needs of high achievers.

Keywords: teaching, engineering, higher education, excellence.

I. Role of teachers: Literature review.

Student perceptions concerning learning and teaching processes deeply affect how they think, feel and behave in the pursuit of their academic activities. These perceptions can have an important impact on student learning (Hu & Kuh, 2002; Ramsden, 1992). Several authors have been focusing their attention on the importance of learning situations such as perceptions of students about their teachers, teaching methods, assessment procedures, as well as curricular content and learning approaches (Biggs, 2000; Entwistle, 1991; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Lawler, Chen, & Venso, 2007; Mooney & Mooney, 2001). In general, the studies in this field provide an understanding that the good teacher is not exclusively bounded by scientific competences. Instead, they include components about the way teachers teach and how they motivate and relate to their students (Korthagen, 2004). From a pedagogical viewpoint, the research emphasizes the need for teachers to explain and communicate and, in particular, to make the course content more understandable for the students (Davies, Arlett, Carpenter, Lamb & Donaghy, 2006; Lawler, Chen & Venso, 2007; Menges & Austin, 2001; Ramsden, 1997).

Another important aspect is the ability of the teacher to encourage students in the learning process by promoting intrinsic motivation, self-regulation of learning and the development of deeper approaches to learning, which imply a critical analysis of new ideas resulting in a more profound, longer and structured retention of the concepts learned (Biggs, 2000; Chickering & Gamson, 1987; Kuh et al., 2006; Lawler et al., 2007; Menges & Austin, 2001; Mooney & Mooney, 2001). Some studies also refer to a socio-affective dimension in teaching, which emphasizes the importance of teachers establishing some closeness through dialogue with students (Chickering & Gamson, 1987; Davies et al., 2006).

The current literature seems to be well developed concerning the most valued characteristics of students regarding their teachers. What is not so clear, are the perceptions of

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high achiever students about the role of their teachers throughout their pathway. There are some general aspects mentioned by the authors in relation to the literature of giftedness that draws attention to the subject; namely, the role of support figures for the promotion and development of talent (Gagné, 2004; Kaufmann, Harrel, Milam, Woolverton & Miller, 1986; Renzulli, 2002). The teachers or mentors are also important figures in the theoretical models, which conceptualize academic excellence with respect to the development of expertise. In this specific domain, the role of teachers or mentors consists of providing instruction about how sequences of simple training tasks can allow students to master more complex tasks, and also to what degree of mastery the simpler tasks have to be acquired for them to serve as building blocks for more complex skills (Ericsson & Lehmann, 1996; Ericsson, 1998).

Talented students in higher education also seem to be more sensitive to the quality of teachers in their specific area and they need more appropriate responses from their teachers in terms of depth of research, up-to-date knowledge, and autonomy in order to construct their own knowledge (Csikszentmihalyi, Rathunde & Whalen, 1996). Some authors have also emphasized the importance of respecting their interests and vocational projects, because the academic involvement of talented students is a result of their intrinsic motivation for learning (Renzulli, Gubbins, Siegle, Zhang, & Chen, 2005).

Several theoretical models recognize that excellence is the product of an interaction between personal and contextual factors (Gagné, 2004; Heller, 2005; Heller & Viek, 2000; Trost, Heller, Mönks, Sternberg, & Subotnik, 2000). However, very little is known about the requirements or optimal conditions for talent development. There are some studies that indicate that an environment of promotional assistance can make a great difference in the achievement of gifted or talented students (Heller & Viek, 2000; Zuckerman, 1992). As it is argued by Heller and Viek (2000), without that knowledge about the specific role of the contextual factors, namely the role of teachers involved in the talent development process, it is difficult to select goal-oriented, individualized, realistic support measures. The implementation of appropriate measures in early stages of talent development can make a great difference on motivation and future achievement (Arnold, 1994; Subotnik & Arnold, 1993). Some longitudinal studies have even demonstrated the relationship between outstanding academic achievement and exceptional success on future career (Lubinski et al., 2006; Lubinski & Benbow, 2006). This aspect reinforces the importance of having a clearer understanding of factors that promote success, since it will also contribute in preparing more motivated and qualified professionals to face and adapt to an increasingly demanding and competitive work world.

The current literature provides some general indicators about important contextual factors to the quality of instruction. However, there are no empirical studies that integrate those several aspects with the perspective of higher achiever students. So the research question guiding this study is as follows: How do the students with high achievement coming from several engineering courses understand the role of their teachers? It is the aim of this article to identify the most valued characteristics of teachers from the student perspective as well as to understand the perceptions of students on the influence their teachers have on the development of their greater talent and achievements.

II. Method.

A. Participants.

The participants presented in Table 1 are ten Portuguese engineering students with an average grade equal to or higher than 16 (in the range from 0 to 20). The number of students in this cohort normally represents one to two percent of the total number of students in the third, fourth and fifth years of engineering courses at the University of Minho, which significantly reduces the number of potential participants eligible for the study of the phenomenon. These students were classified A (excellent), which, according to the classifications of the *European Credit Transfer and Accumulation System (ECTS),* corresponds to 10% of the total number of students. The identification of the participants was made through the award lists representing the best students from the university. The first and second year students were excluded in order to ensure that there was a continuous and consistent pathway of high performance, and that students with isolated situations of success were not under consideration.

Table 1. Participants.

Name	Gender	Age	Year of course	Course
Participant 1	Male	22	5th	Industrial Electronics and Computer Engineering
Participant 2	Female	22	5th	Biomedical Engineering
Participant 3	Male	23	5th	Informatics Engineering
Participant 4	Male	23	5th	Biomedical Engineering
Participant 5	Male	28	4th	Informatics Engineering
Participant 6	Female	20	3rd	Biological Engineering
Participant 7	Female	22	4th	Industrial and Management Engineering
Participant 8	Male	19	3rd	Informatics Engineering
Participant 9	Female	20	3rd	Biomedical Engineering
Participant 10	Male	20	3rd	Biomedical Engineering

B. Procedures.

The 10 participants, who met the chosen criteria, agreed to participate in a research project about academic excellence in the engineering domain. Then, individual interviews of 40 to 60 minutes were scheduled and conducted with participants. The general purpose of this research project was to achieve an in-depth understanding of the specific subject, which applies to a restricted proportion of the student population. Therefore, the participants represent a purposive sampling of a few specific cases.
        The interviews were transcribed verbatim to ensure that the entire conversation was recorded, documented, as well as other important elements of the interviewer-interviewee interaction (e.g., hesitations, exclamations, laughs). In order to standardize the interviews, a guide was developed, which included topics that emerged from the theoretical review, according to the suggestion of Bogdan and Biklen (2002). The interview guide was then evaluated by psychological supervisors, who assessed its validity, clarity and adaptation to the participants and the aims of the study, as recommended by Whittemore, Chase, and Mandle (2001)**.** The

interview consisted of collecting generic data from the participants, followed by questions to explore self-reflections about their biographical pathways. The topics questioned were the previous and current academic experience, self-conceptions, perceptions of competency, the role of significant people in the pathway, and the future projects of the participants. These methods assisted the research team in understanding the perceptions of participants about the role of their teachers. Specific questions were formulated taking into account the suggestion of the literature about the role of incentive and support figures for the development in high achiever individuals (Gagné, 2004; Kaufmann et al., 1986; Renzulli, 2002) or as mentors that follow the development of expertise (Ericsson & Lehmann, 1996; Ericsson, 1998). Some of the questions were as follows: "Which characteristics do you think are important in a teacher?"; "Which characteristics do those people who influenced you have?"; "What was the teachers' role through your pathway?"

C. Data analysis.

The procedure of content analysis proposed by Schilling (2006) followed the data collection phase of this investigation. This particular phase consisted of a process of data analysis with a preliminary categorizing system developed that utilized the literature review as an artifact. The grid of that preliminary category system was then applied by three different researchers on several interview transcripts. After that procedure, the team discussed the main divergences until it reached a consensus and then the necessary categories were reorganized.

The excerpts in which teachers were mentioned or in some way referred to were then separated out. The computer software MAXQDA (Verbi, 2007) was used to analyze the interviews by performing computer-assisted qualitative data analysis, which functioned as a tool facilitating the process of organization, visualization and systematization of the data collected. An open coding was then performed, which consisted of decomposing the data into units of analysis. The definition of units of analysis followed the criteria proposed by Tesch (1990) and represented "segments of text that are comprehensible by themselves and contain(s) one idea, episode, or piece of information" (p. 116). A code was assigned to each segment that encapsulated its meaning and, subsequently, a systematic comparison across the new information waiting to be coded and the information already coded was performed. This last procedure was based on the methodology of Strauss and Corbin (1990).

III. Results and discussion.

Five categories emerged from the data collection and they are as follows: affective and emotional relation, motivation, recognition, instruction style, and demand. For each emergent category, the main aspects descriptive of the category were explored. Short excerpts from the interviews were also selected based on their representativeness and to exemplify the general meaning of each category presented below. The interviews were carried out in Portuguese, so it was necessary to make some translation adaptations so that some of the quotes made sense.

A. Affective and emotional relation.
- Patience
- Availability
- Openness

The relationship between teachers and students seems to have had an important impact on the development of the students. This relationship manifested mainly through the patience, availability and openness of the teacher. The affective and emotional component is expressed in several ways with major emphasis on the personal characteristics of the teachers and the values transmitted to students daily in their established relationship:

> To be patient, when we don't understand something. (Participant 1).
>
> (…) those [teachers] who make themselves available to help with homework and to answer questions about tests. (Participant 2)
>
> It is important. Especially some of them, they are much more available to us than we expect them to be. This was the case of some teachers who are not teaching us any specific subject at the moment, but that had already been our teachers, and nevertheless they still provide us support if we request. (Participant 7)
>
> (…) I think that openness is important, it doesn't create a barrier... that barrier of the 'I'm here, I'm the teacher, you are there, you are the students' teacher. I think if ... if we forget that and if we behave as peers… I think that is important. (Participant 6)

These findings corroborate some other studies, which registered a positive correlation between the emotional involvement of the teacher and a student's academic engagement (Skinner et al., 1993) or their perceptions of competence (Skinner et al., 2008). In the case of these high achiever students, the quality of the affective and emotional relationship with their teachers arises as an important ingredient that is highly valued. These students seem to appeal much to the help from teachers, so a teacher's approachability can make room for a better level of responsiveness to the specific needs of these students.

B. Motivation.
- Influence to the subject interest of student (way teachers give lessons)
- Incentive and stimulus for task engagement
- Role model of the motivation of student

The attitude of the teachers seems to have an important influence on students and can make a great difference by challenging and stimulating students to progress in learning. It seems that the way teachers engage students into subjects can even influence the quality and quantity of the investment that students will put on their academic tasks:

> ... a lot of the motivation isn't related to the content but rather is a result of the way the teacher gives the lesson, their attitude. This is one of the main reasons for my lack of motivation, when I don't like a teacher, I can automatically feel a lack of motivation to do anything (Participant 3).

The literature has given some indications about the importance to consider individual characteristics in specific situations to understand personal motivation (Paris & Turner, 1994). The interaction between the participants and the context – in this case, through the central figure of the teacher – seems to determine the affective consequences and actions of students.

Some participants referred to teachers as important figures to arouse the interest of their students, introducing the curiosity and engagement to the subjects:

> The teacher has to teach and I think that teaching is the only way to kindle more curiosity in the student, to get more involved with the subject.
>
> [Do you think it is important to "kindle the curiosity"?]
>
> I think it is, and I think that should be mainly done by the teacher. Because we

assume that the teacher has a more close contact with the subject and I think it is him/her that must transmit us: "look, this subject is interesting". (Participant 7)

One of the teachers who most influenced me was my math teacher of 7th grade. She did the same as I did: she turned the math classes into games. She was able to do games, she did a lot of things that... for example, a simple figure to connect points with, around 10 equations. We had to solve the equations and then connect the points with the results. She did many exercises of that kind. She probably was one of the persons who most influenced me, because she did what I also did, turning the subject into a game. (Participant 8)

Taking into account that mastery is the result of a sequence of stages of progressive development of skills (Martens & Witt, 2004), the teachers can act as important catalysts for the development of these students with promising potential through the progressive stimulation and the encouragement of learning. That action of providing assistance to a student on an as-needed basis meets the definition of *scaffolding* provided by some authors (Molenaar, van Boxtel, & Sleegers, 2011; Wood, Bruner, & Ross, 1976). That constructivist perspective of learning is also discussed by Savery and Duffy (1995) when they refer to the learner's "puzzlement" as being the stimulus and organizer for learning, whereby the teacher can make room for students to develop an active involvement into the process of learning.

The teachers are also important role models for the development of the passion and motivation of the students for their specialization:

I admire the teacher, I know he is someone who knows a lot about my subject, electronics, with an emphasis on communications, and I try to understand everything that I can… (Participant 3)

(…) there are some teachers whom I really enjoyed, they were like models, because I liked them, you know... (Participant 1)

Some other studies have referred to the teacher as an important model for their students in the development of passion and motivation for learning as well as future professionals (Carbonneau, Vallerand, Fernet, & Guay, 2008; Mckeachie, 2002). Moreover, our findings illuminated that teachers become role models or someone who the students can identify with when they feel an admiration for them. The teacher, as a role model, can then function as a model of success in order to simultaneously stimulate the success of their students.

C. Recognition.
- Recognition of the ability and potential
- Invitation to integrate projects

The recognition of the students by teachers serves as a positive reinforcement and seems to motivate participants. In particular, recognition of the ability and/or potential of the students and invitations to participate in projects can create positive attitudes amongst the students. In the words of a participant:

(…) knowing that my teachers think I am capable based on the things I have done in class and on the personal projects I am involved in (…) I think that most teachers felt like I was one of the people interested in the materials we have to study. I can give an example of my present supervisor and course director… who I think likes me in good faith (Participant 4)

Students demonstrated in some situations to put an intentional effort for teachers to realize the quality of their work:

> When doing projects in my area I try to figure out whatever I can do, so that they will look at it and say "this [a piece of work] shows something very well done." (Participant 5)

Participant 2 also referred to the recognition of her teacher through invitations to work with him:

> …I had a class last semester with a teacher and this semester he invited me to do a parallel project about biomedical engineering in Portugal (…) and now I have been invited to continue on a doctoral program as well.

This seems to signify that it is not enough for these students to recognize their own personal abilities – positive perceptions of self-competence – they also need their potential and abilities to be recognized by others, especially by their teachers. This external recognition functions almost like a motor for their academic involvement by giving them the power to continue pushing forward.

This recognition can have a special emphasis in the case of high achiever students considering their most notable efforts in relation to their work. The research on giftedness has been addressing some attention to the issue of identification of talents and to the development of appropriate educational programs (e.g., Feldhusen, 1996; Freeman, 1998; Renzulli, 2005). However, it seems that regardless of the existence of those programs, the teachers have an important role recognizing the potential that can become concretized on opportunities to demonstrate, apply and promote interests and capacities of their students.

D. Instruction style.
- Mastery of subject
- Ability to transmit knowledge

The instruction style is discussed here as the particular way a teacher transmits material to students. Participants focused on two essential aspects in this category: mastery of the content to be taught and the ability to transmit knowledge. These concepts are illustrated in the interviews with students:

> …I think that it is his knowledge of the material (...) he was also my teacher in other disciplines and he actually knows a lot about the subject, he knows what he is teaching, so I try to learn as much as I can. (Participant 4)

Participant 5 also expressed the importance of the efficient transmission of knowledge:

> I think a teacher who knows how to teach is someone who knows how to explain things in different ways, when we ask a question.

In addition, the participants commented critically on the situations in which their teachers did not have these characteristics:

> …they [teachers] have to master the material. Incredibly, we have already had some teachers who pretty much don't know anything about what they're trying to teach us. They just read the slides and if you ask a question that is slightly off the topic, they don't know the answer (…) and this kind of thing should not happen at the university (Participant 5).

The instruction style, therefore, is pointed out by participants as the result of a combination of the teacher's knowledge of the subject content and of pedagogical skills. These findings can be corroborated with other studies illuminating students' experiences in general, which pointed to the combination of the mastery of the subject with the mastery of teaching methodologies as characteristics of the best teachers (Krauss et al., 2008; Smith & Strahan, 2004).

E. Demand.
- Continuous stimulation in order to progress
- Demanding assessment

The participants discussed the value of high demands in the academic context. This demanding atmosphere seems to be related to the need to have favorable learning conditions and the need to be stimulated by the teacher in order to progress academically. In the words of two participants:

> I always preferred teachers who were more demanding, than teachers who were like... give away everything already done. I don't like those teachers. I think I' m the opposite of my colleagues. The worse is the teacher, the better for me. Because it makes me feel the need to show that I am worth something (…) I don't content myself with low marks. I want to be the best (…) I don't like teachers who are very relaxed, and that easily give good marks to students. Because sometimes I study very hard and I apply myself a lot and the test questions are really basics (…) and I get sad because 'how will I show my knowledge?' (…) I like to be challenged. (Participant 9)

> (…) I think it should be a little demanding in order to keep us moving. (Participant 1)

> A teacher who I really liked was a professor of electromagnetism that I had in the 2nd year. That teacher, was quite demanding at the beginning of the year and we keep that idea of her, that she was quite demanding (…) and that also contributed a lot to me to study more and to have a best performance in that subject. (Participant 10)

The participants illustrated what was expected taking into account the recommendations of the literature (Chickering & Gamson, 1987; Heller, 2004; Tomlinson et al., 2003): the importance of the learning process to be adapted to the individual characteristics of each student in order to promote their maximum development. In the specific case of talented students, the implementation of appropriate levels of motivational challenge, in addition to appropriate teaching, learning and assessment, emerge as relevant aspects to keep students academically engaged and fulfilled.

IV. Conclusions and implications.

Data collected from these interviews with purposively selected participants leads to the following conclusion. Teaching and teaching contexts are important for these high achiever students and that importance can be synthesized into three main aspects that are valued in a teacher and in the context of learning: (i) the quality of the affective relationship that teachers establish with their students; (ii) the ability to transmit knowledge and stimulate students to learn; (iii) a demanding context, which encourages and keeps them motivated. These aspects match some of the principles for good practice in undergraduate education summarized by previous authors (Chickering & Gamson, 1987; Kuh et al., 2006). Namely, an intentional focus on keeping contact with faculty members; to encourage active learning; to provide feedback and opportunities to improve performance; to have high expectations of students ("expect more and you will get it"); to respect diverse talents and ways of learning (Chickering & Gamson, 1987). The main difference seems to be found in the adaptation of these aspects to the specific needs of high achiever students. For example, attending to their higher level of learning and being continuously adjusted to students' responses is essential to challenge and inspire these students.

High achievers tend to be more sensitive, to request more from their context and to seize the opportunities provided throughout their pathway. They prefer more demanding and stimulating contexts compared to the average of students, because they can achieve more and they like to feel continuously challenged by the content being taught. That can make the difference in terms of what they valorize and the profit they take from their experience.

On the other hand, the five categories identified seem to converge to emotional and volition factors of learning, in which the teacher is pointed as a key element through several stages of learning: to arouse the interest and curiosity of students to learning; to keep students engaged with learning, providing stimulating contexts and offering their availability to help when necessary; and to act as a model of passionate and successful professionals. From the perspective of these participants, learning is much more than the simple transmission of knowledge. These results illustrate the complexity of issues inherent in teaching tasks and learning, which is consistent with the position of Korthagen (2004). Clearly, learning is not the product of purely cognitive factors, but it is also affected by emotional, volitional and behavioral aspects.

Finally, the data obtained and subsequent findings extrapolated from this study have implications for teaching and learning in higher education. The data collected draws attention to the importance of adapting learning environments to the needs and characteristics of the students. It is crucial that high achievers find enough stimuli and challenges in their learning contexts to develop to their full capacities; not only as students, but as future professionals. What then can be some good, potentially transferable practices for high achievers students?

1. Be available to discuss subjects of the students' interests outside classroom.

2. Give students space to explore. Give them space to expand and create thinking opportunities. Do not only be attached to the curricular program

3. Share the enthusiasm for the subject and for learning in general. Talk to students about subjects and aspects of your field that fascinate you.

4. Stimulate students' curiosity. Identify daily problems to solve and apply theoretical subjects into it.

5. Teach research skills that can allow them to recognize, describe, and understand more about what fascinates them.

6. Make challenging proposals to them, discussing with them themes of interest which can be objects of or catalysts for learning and assessment or potentially integrate extracurricular projects.

7. Show attention and recognition to their work and achievements, but also to their efforts to progress.

To conclude, the participants are searching for and preferring more inspiring environments and teachers who complement their unique academic characteristics. If these students ask for more and better, then it should be given more and better. Obviously, not all the students fit at the top of performance or can be recognized as high achievers, but it is important that those who can achieve that peak have the right path to get there and sustain high levels of engagement and achievement once on that right path.

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