

Student development using emotional intelligence

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ABSTRACT: The state of the emotional intelligence of students attending a first year elective course suggested the need to lower the high levels of anxiety and disappointment, while also supporting pride and trust. Also, by augmenting students' emotional intelligence, it is anticipated that the high percentages of students displaying overall cynicism and pessimism should decrease, and the percentages of students displaying optimism should increase. The challenges for professors in developing the emotional intelligence of students involve activities that engage students in developing their skills in self-knowledge and the self-management of their emotions, their social knowledge of the emotions of others, as well as social management for communication, group cooperation and leadership.

INTRODUCTION

The awareness and ability to manage one's emotions in a healthy and productive manner is called emotional intelligence. Other definitions consider it to be *the ability of a person to understand his feelings and the feelings of others, to distinguish and use his feelings as guideline in his thinking and his actions* [1]. As part of the social sciences, emotional intelligence has been studied for more than 20 years and is usually used by social scientists to research the skills needed for success in the workplace. Very often in organisations and companies, people with successful performance have developed skills in emotional intelligence, which have contributed to their success [2-4].

Research has shown that people in higher positions in organisations have more competences in the emotional intelligence domain than in other domains, such as cognitive abilities and technical skills [5]. Emotional intelligence abilities are a priority for human resources management that gives guidance in hiring and promoting people, and gives directions for developmental efforts in large organisations [6]. Especially regarding the process of applying changes in the workplace, it has been shown that the emotional intelligence levels of leaders, who try to promote such changes, help to lower the adverse reactions and cynicism of employees to these changes [7].

The first attempt to assess emotional intelligence as a measure of well being was conducted shortly before the first model of emotional intelligence was presented [1][8]. This was long before the model of the five main domains of intrapersonal skills, interpersonal skills, adaptability, stress management and general mood was presented [9]. Later, definitions of emotional intelligence and theoretical models were developed [5][10]. Some of these models and definitions are complementary to the original definitions, rather than contrasting with them [11].

Lately, the definition of emotional intelligence was given in terms of a classification of emotional and social knowledge, which influence the overall ability of a person to effectively address environmental or social problems [12]. This is as follows:

- Understand, be aware of and express oneself;
- Be aware of, understand and relate to others;
- Deal with strong emotions and control one's reactions;
- Adapt to change and solve problems of a personal or social nature.

The same model can be expressed differently in the organisational research area regarding leadership [13]. The two dimensions are namely:

- Personal dimension:
 - Self-knowledge (emotional understanding, self estimation and self assurance);
 - Self-management (self control, adaptability, attainment and initiative).
- Social dimension:
 - Social-knowledge (self feeling, organisational feeling and service);
 - Social-management (development of people, conflict management, building links, group cooperation and leadership).

According to the model, emotional intelligence consists of four directions: two personal (self-knowledge, self-management) and two social (social-knowledge, social-management). Each category of the four directions involves emotional skills along with the mental skills that are used by an individual to perform successfully in the workplace [14].

In the present research, the emotional level of students in a specific class was analysed and the findings studied in order to help design the actions for the emotional development of the students.

RESEARCH PROCEDURE

The research was undertaken at the School of Civil Engineering of the National Technical University of Athens (NTUA). Students who enrol at the NTUA are high school graduates who like mathematics and physics, and are determined to study engineering. The average age of students is 19 years old and the proportion of women to men is almost equal. The sample of students questioned was collected from first year students (2nd semester), who took the course *Renewable Energy*. This course is a selective course that almost 300 students take each year. From these students, 120 students seated in three classrooms during their final examination were questioned, with 110 responding to the questionnaire shown in Table 1.

Table 1: Questionnaire given to students.

<i>Self and Social-Knowledge, Self and Social-Management.</i>				
1. What are your emotions regarding your studies at the NTUA?				
Destructive emotions		Constructive emotions		
Anger	Disappointment	Passion	Pride	
Fear	Anxiety	Trust	Devotion	
2. How do former students talk about their studies at the NTUA?				
3. How frequently do you attend the course?				
0-5%	25%	50%	75%	90-100%
4. What grade do you expect for the course?				
F	D	C	B	A
5. What is the importance of the course in your profession?				
6. What is your vision for your studies and your professional life?				
7. What are your emotions regarding the contents of the course?				
Destructive emotions		Constructive emotions		
Anger	Disappointment	Passion	Pride	
Fear	Anxiety	Trust	Devotion	
8. What are your emotions regarding the lecturers of the course?				
Destructive emotions		Constructive emotions		
Anger	Disappointment	Passion	Pride	
Fear	Anxiety	Trust	Devotion	
9. What would you like to suggest for the improvement of your studies?				
10. What are the values adopted by the NTUA that are apparent to you?				

Questions 1 and 2 refer to the attitudes of the students as they start their studies at the NTUA. Questions 3 and 4 refer to the self-knowledge of the students, questions 5 and 6 to the social knowledge, questions 7 and 8 refer to the self-management, and questions 9 and 10 to the social management.

According to the students' answers to the question *What are your emotions regarding your studies at the NTUA*, four main groups were distinguished. Shown in Figure 1, the answers are expressed as percentages of the total versus the four groups.

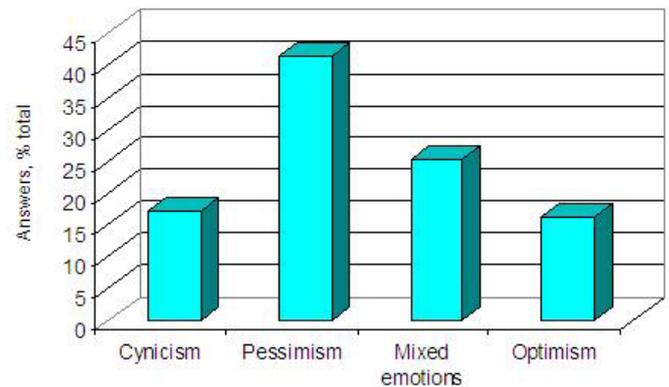


Figure 1: The number of answers expressed as a percentage of the total versus the four groups.

Student groups were then formed according to their attitudes and mainly the optimism they displayed about their studies:

- Group 1: $\frac{1}{6}$ or 17.12% displayed cynicism (negative emotions only);
- Group 2: $\frac{2}{5}$ or 41.44% displayed pessimism (negative emotions with only one positive);
- Group 3: $\frac{1}{4}$ or 25.22% displayed mixed emotions (negative and positive emotions);
- Group 4: $\frac{1}{6}$ or 16.22% displayed optimism (positive emotions with only one negative).

The answers to the question *How do former students talk about their studies at the NTUA* are presented below for each group.

- *Cynicism*: Difficult studies, inadequate skills are earned, disappointment follows because of no jobs or hard work conditions and low salaries;
- *Pessimism*: Difficult and exhausting studies, much anxiety, phenomena of strange teachers, mainly generalities, disappointed students;
- *Mixed emotions*: Difficult studies, fear and anxiety, not adequate practical knowledge and experience, while the expected excellent career is only a dream;
- *Optimism*: Very proud, full of passion, completely pleased, satisfied for the level of studies, recognised professionals, studies promising a prosperous future.

The above answers indicate the attitudes of students as they began their studies by knowing what to expect from their studies and the profession. Outside the pessimistic attitudes of hard work at the University, followed by few job prospects and low salaries, the optimistic attitude was very encouraging for the positive climate in the classroom and the psychological preparedness of students.

OUTCOMES OF THE FOUR GROUPS

For the first question, *What are your emotions regarding your studies at the NTUA*, the answers were plotted as percentages of total positive and total negative emotions, as shown in Figure 2. From the positive emotions, pride was found to be the prominent emotion, while from the negative emotions, anxiety was determined to be the prominent one.

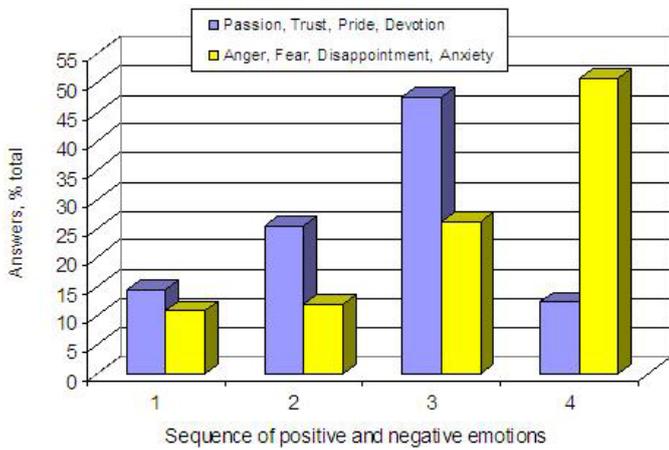


Figure 2: Positive and negative emotions for each characteristic group.

The positive and negative emotions are shown separately for each group in Figures 3 and 4, respectively. The prominent positive emotion for all four groups was found to be pride, with trust coming second. Of the negative emotions, the highest for the three groups from pessimism to optimism was anxiety, with disappointment being the highest for the cynicism group.

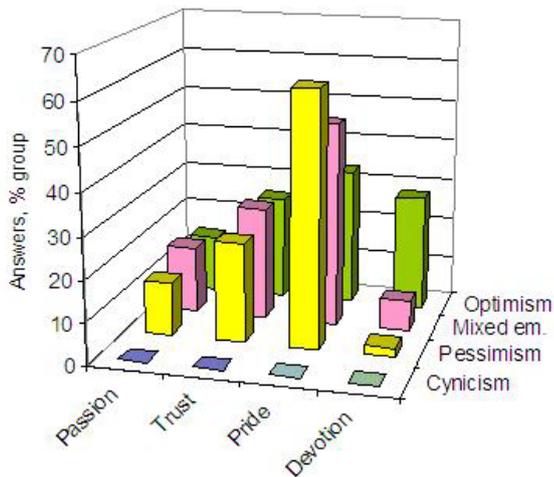


Figure 3: Positive emotions for the four groups.

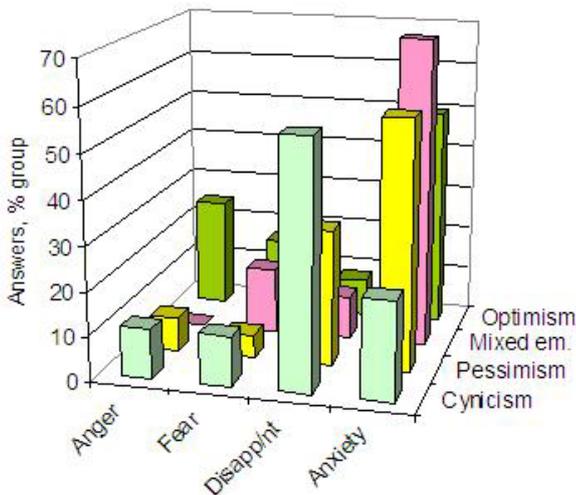


Figure 4: Negative emotions for the four groups.

As shown in Figure 3, those students who belonged to the group of cynicism did not display any positive emotions. In all

of the other groups, pride was evident with higher percentages for the pessimism group and lower for the optimism group. Passion and trust were found to be almost equivalent for the three groups of pessimism to optimism, while devotion was found to increase with optimism.

As shown in Figure 4, the prominent negative emotion was anxiety, which was found to be not so important for the cynicism group compared to the pessimism to optimism groups. Disappointment was found to be very large for the cynicism group, but was scored lower down for the pessimism to optimism groups. Anger and fear did not show any significant trends, although the cynicism and optimism groups displayed some higher values.

The very first question revealed the separate groups of students, with expressed pronounced emotions that needed to be addressed in the classroom. High level of disappointment expressed by the cynicism group are associated with lower degrees of anxiety, anger and fear. Higher levels of anxiety were present in the pessimism to optimism groups, which was also accompanied with high levels of pride, and adequate amounts of passion and trust.

OUTCOMES OF THE FOUR DIRECTIONS

The rest of the questions were asked with the goal to assess the directions or attitudes of students towards (self and social) knowledge and (self and social) management.

Self-Knowledge

Regarding the students' opinions on *How frequently do you attend the course* and *What grade do you expect for the course?*, the answers were plotted and are displayed in Figure 5.

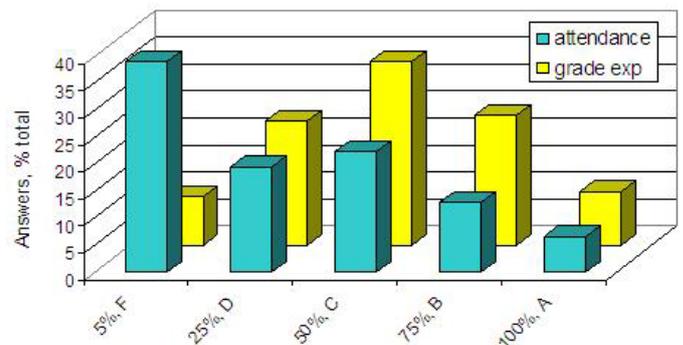


Figure 5: Attendance of the students in the classroom and the grades expected for the four groups.

Regarding their attendance, almost 40% of respondents answered that they had very low attendance, while full attendance was achieved by just over 10%. Those students who expected top grades comprised less than 20%, while the majority expected average grades.

These figures do not imply that the majority of non-attending students expected an F, and those who attend 100% of the time expected an A. Indeed, the largest group of the students, or 35%, anticipated an average grade of C.

No further study of each group for attendance versus expected grade was made, although there were cases of non-attending students who were expecting high grades and vice versa.

Self-Management

The answers to the question *What is the importance of the course in your profession?* are listed below for each group:

- *Cynicism*: The course is not at all important, no contribution to the education of the civil engineer, the theoretical aspects are boring and difficult to attend;
- *Pessimism*: Adequately important to the class, with some encyclopedic knowledge, but not directly connected to the profession, complementary education;
- *Mixed emotions*: Important as basic knowledge or more general knowledge, but not necessary to the civil engineer, unless interested in energy applications;
- *Optimism*: Very important for the profession, especially to those interested in energy resources and in designing structures of energy production and distribution.

The answers to the question *What is your vision for your studies and your professional life?* are shown below for each group:

- *Cynicism*: There is no vision at all for the studies or careers of students;
- *Pessimism*: Engineering education with no vision, much anxiety and disappointment, more expectations for their professional careers;
- *Mixed emotions*: Vision to become good engineers, design and build with safety, other factors affecting unemployment;
- *Optimism*: Great vision, excellent studies, bright career, solving challenging professional problems and helping to improve life.

From the above answers, it is evident that opinions varied from very little to very high levels of appreciation of the course, and from no vision to great vision for studies and students' professional life.

Social Knowledge

Regarding the students' opinions on *What are your emotions regarding the contents of the course?* and *What are your emotions regarding the lecturers of the course?*, the answers were plotted and are shown in Figure 6.

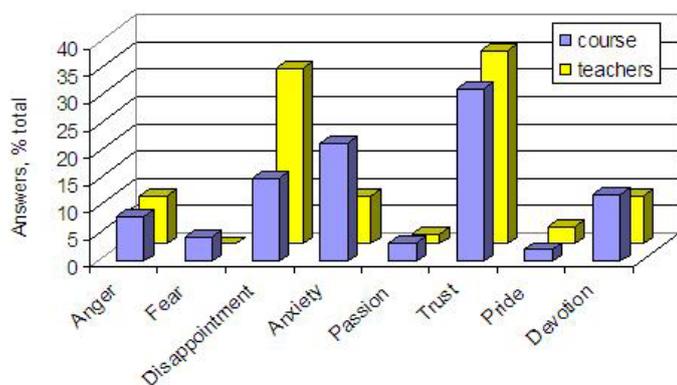


Figure 6: The distribution of answers regarding students' emotions towards the course and teachers.

Regarding the course itself, the two prevailing negative emotions were found to be anxiety and disappointment, while

the one prevailing positive emotion was indicated as trust, with devotion coming second. Although they trusted and showed devotion to the course, students also displayed large amounts of anxiety about the uncertainty of the outcomes of the course and disappointment if the course did not meet their expectations.

Regarding the students' emotions towards the teachers, there was disappointment detected in large percentages with regard to inadequate teachers, and anxiety at the same level as anger, as if the students did not know what to expect from their teachers. However, the students primarily trusted their teachers, and secondly, they were also devoted to their teachers, expecting that their teachers would do their best to educate them and help them to develop their skills.

Social Management

The answers for the question *What would you like to suggest for the improvement of your studies?* are listed below for each group:

- *Cynicism*: No more strikes and takeovers from students and professors, less useless material, needed regulations on required attendances;
- *Pessimism*: Less general engineering education, less required classes, more electives, computer applications, updated material and engineering software;
- *Mixed emotions*: Interests of the professors to be understood by students, incentives to students to approach and understand the nature of the profession;
- *Optimism*: Better management and organisation, quality of teaching and courses, applications and educational trips, friendlier environment in the classroom.

The answers on the question *What are the values adopted by the NTUA that are apparent to you?* are shown below for each group:

- *Cynicism*: Revolutionary attitude, high quality of teaching considered for only a few courses;
- *Pessimism*: Quality of teaching disappointing, average organisation and coordination, adequate information not always visible;
- *Mixed emotions*: Quality and adequateness of the courses and trust of professors, but very bad organisation of the studies;
- *Optimism*: Good organisation, quality of courses, good professors, directions for orientation, appreciation of work, reward, respect for each other.

From the above answers, it is evident that the suggestions for improvements refer to the re-organisation of the courses and the introduction of modern educational techniques, as well as to the school's suggestions for better organisation and an improved quality of teaching.

DISCUSSION

Regarding the outcomes of this research on the four groups, distinct differences were detected regarding their emotional intelligence, ie their positive emotions (pride and trust) and their negative emotions (anxiety and disappointment).

The students engaged in this research indicated differences in their emotional intelligence, ranging from cynicism to

pessimism, and from mixed emotions to optimism. Each of these groups requires special behaviour from teachers. Researchers found that students were displaying differences not only in the levels of motivation and attitudes in teaching and learning, but also in the different responses in the specific classroom environments and instructional practices, all of which need to be addressed by teachers [15].

The main negative emotion expressed by the students was found to be anxiety, without further research required to identify if this was short-term or long-term anxiety, and what the reasons were behind it. Researchers studied students' anxiety levels related to a short-term or a long-term emotion and students' self-image, and not to their study skills, problem solving skills, or avoidance in engaging difficult problem solving [16].

The second negative emotion expressed by the students was found to be disappointment, which refers to the expectations from their studies and workplace demands. Researchers found that learning the language of the workplace is a different process from attending a university engineering curriculum, which certainly does not consider the skills of interpersonal relationships, crisis management and objectivity [17].

The main positive emotion expressed by the students was found to be pride, which is mainly related to successful alumni and the prestige of the school. In an alumni survey that was designed to evaluate an engineering programme's success, researchers asked alumni to rank the importance and their preparation they had in the 11 desired outcomes of the Engineering Criteria (EC 2000), and grouped the different perspectives by degree programme, career path and demographics [18].

The second positive emotion was found to be trust, although the students commented on the friendliness and accessibility of the teachers. The researchers found that the accessibility of the instructor outweighed other factors, such as perceived course workload and expected grade in the course. A strong correlation was detected between the instructor rating and instructor accessibility [19].

From this research, the conclusion is that university professors need to have skills to appropriately manage the negative and positive emotions of their students. Other researchers in similar situations found that the challenges for both professors and institutions are to help facilitate teachers application of new approaches in teaching and learning in order to generate more powerful forms of engineering education [20].

DIRECTIONS FOR ACTION

Regarding the outcomes of the research on the self- and social knowledge and management, the directions for action for professors and students are summarised below.

Self-Knowledge

Self-knowledge refers to the ability of students to realise and be aware of their emotions, thoughts, needs, strengths and weaknesses in each situation. Students with developed self-knowledge are in touch with their negative emotions and are able to understand that these emotions can affect their studies. In this study, the answers to the self-knowledge questions indicate that students were disappointed, they did not come to the class in

great percentages, they expected average grades, and only a few came to class regularly and expected high grades.

The challenge for professors is to foster positive emotions in their students and encourage them to find and eliminate sources of negative emotions for other students. Also, professors have to help their students as follows:

- Have a clear description of their vision, the values of the course and the values of the school from the beginning of the semester;
- Understand early in the semester the destructive emotions (anger, fear, disappointment and anxiety) that suppress development, and the creative emotions (passion, trust, pride and devotion) that help advancement;
- Transform into visible the invisible emotions, which are not expressed by students and are usually negative.

Self-Management

Self management is the ability of students to manage their emotions, impulses and behaviours, and make them work in favour and not against them. This involves students expressing their positive emotions creatively and controlling their negative emotions before they become destructive. The students' answers to the self management questions indicate that their perspectives varied from low to high levels of appreciation of the course, and they had no to high visions for their studies and profession.

The challenge for professors, then, is to engender a climate of the free expression of emotions in the classroom, with no forbidden emotions or no professional or *taboo* expressions of emotions. Also, professors have to help students as follows:

- Win and retain the trust of professors and freely communicate information on facts and attitudes regarding the courses;
- Manage their negative emotions when they appear, keep them in control and face the causes behind these emotions;
- Welcome all comments from professors, whether positive or negative, and avoid emotional withdrawal from class activities.

Social Knowledge

Social understanding describes the ability of students to understand their emotions and the needs of other students and professors, and behave accordingly. High levels of social understanding indicate that students can accept diversity, the individual characteristics of others, ideas and proposals from professors and students. The answers to the social knowledge questions indicate that the students displayed trust to a high percentage with devotion coming in second, while disappointment and anxiety were present and addressed to their teachers and the course.

The challenge for professors is to apply educational plans for the exchange of roles and positions and have students present interesting case histories. Also, professors have to help students as follows:

- Listen carefully to professors with a willingness to understand not only their words but also the emotions behind the words;

- Respect the individuality of other students and teachers as well, and orient their attitudes against prejudgements and stereotypes;
- Consider other students and teachers and their emotions in each state of change of a continuously evolving course.

Social Management

Social management involves the ability of students to communicate with others, develop relationships and cultivate leadership skills. Students who positively manage relationships use their own methods to convince and affect others, create support networks to their attitudes and positioning, insist on win-win situations, avoid polarisation and manage conflict. The answers to the social management questions indicate that students were ready to state their needs to the teachers and school regarding the re-organisation of courses, new educational methods and the quality of teaching.

The challenge for professors is to observe carefully the attitudes developing between student groups, and to take action so that internal conflict is avoided. Also, professors have to help students as follows:

- Search and create opportunities for group cooperation and develop continuous connections at the working and social levels;
- Support a relationship network among students by working in groups and exchanging information;
- Create a culture of continuous communication with other students and professors, and apply the tactics of talking with people and not to people.

CONCLUSIONS

Considering the effect of interaction of people and the environment in the classroom, the development of students' emotional intelligence would require lowering the high levels of anxiety and disappointment, while also supporting pride and trust. In this way, the percentages of students who display overall cynicism and pessimism should decrease, and those displaying optimism should increase.

The challenges for professors are to take action in order to help the emotional development of students. These actions will involve having students develop their skills regarding self-knowledge of their positive and negative emotions, skills to manage their negative emotions, skills to understand the emotions and individuality of others, and skills to support continuous communication, group cooperation and leadership.

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