

## **PEDAGOGY ENHANCING ENGINEERING GRADUATES' EMPLOYABILITY**

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### **INTRODUCTION**

The traditional focus in higher engineering education on technical abilities has been well substantiated by the types of abilities required in industrial processes. However, the emerging changes in operating environments and the growing demands for wider competence bases necessitate a more personal configuration of abilities facilitating contextual performance in organizations and graduates' employability and career opportunities. This paradigm shift is evidenced by studies reporting that success in professional life is the result of individuals' social competence.

Social competence, also labeled as soft skills, forms an unmanifested or inarticulate dimension of professional expertise that has for long remained undefined. To enhance the incorporation of working life skills in higher engineering education, this paper identifies a competence level on top of the substantive foundation that helps transform field-related engineering expertise into effective individual and team outcomes. The professional skills framework proposed enhances engineers' intra- and interpersonal competences by addressing their motives, values, attitudes and skills.

The Social Competence Model slices engineers' interaction competence into the most pertinent communication skills, that is, emotional regulation, empathy, assertion, and inspiration. It demonstrates how social and emotional skills fit into the overall professional competency of engineers by providing instruments for more effective application of their substantive knowledge.

These skilling requirements urge a reform of engineering education through the incorporation of professional qualifications into the technical, substantive syllabi. As pedagogy appropriate for disseminating social competence, this paper proposes student empowerment and teacher immediacy, calling for subsequent measures also in teacher training to secure teacher competence in the field of socio-emotional methodologies.

## **1 THE MAKE-UP OF A PROFESSIONAL ENGINEER**

This paper proposes communicative language education as a means of motivating students both for their language studies but also for a more holistic development of their professional skills and identity. The findings derive from a study conducted within a larger doctoral research project that identified social competence in engineering and pedagogy for pursuing it. The quantitative study examined a sample of 434 engineers operating in seven engineering organizations. [1]

The paper consists of two parts: the first section reviews dimensions of professionalism and skills that should be incorporated into engineering syllabi to more effectively allow engineers to apply their substantive knowledge at work. The second section discusses pedagogy for equipping engineers with the professional competences.

### **1.1 Attitudes and values**

As engineers represent not only themselves but also their profession in society, integration of attitudes, engineering identity and a professional value base need to be fostered already during university studies. Attitudes are decisive in driving an individual's ability for self-management and skills development. The key values in the postmodern engineering community stem from growing awareness of the role of engineers as solvers of today's social and societal problems, placing sustainable development at the centre of the engineering value base. [2]

### **1.2 Motives**

Motives refer to the ability to channel mental motives (by amplification or diminishing), guide them with emotions, and direct action towards socially attainable goals. They serve as the link between substance knowledge and interaction skills and explain for variance in the extent to which the individual engineer succeeds in developing and learning social skills pertinent to interaction and in applying them at the workplace. [3]

#### **1.2.1 Sociability**

To succeed in life and at work, individuals have to get along with themselves and with others. [4] Finns and especially Finnish engineers harness a reputation as intraverts and the pressure for outspokenness and higher-level presentation skills is largely recognized. However, based on the present research, employees do not expect their supervisors to be confident and highly extraverted individuals with superstar charisma and motivation for inspiring and leading others. Instead, what matters more in recruitment and career development is mastery of social skills. [5]

This is a finding to be recognized and considered in communication education, recruitment and career planning. Sociability has become overrated, perhaps due to lack of evidence countering expectations and unfair requirements related to extraversion. This research serves as a reminder that interaction can be built equally much on individuals' learnable social skills and attitude towards others than on their innate interaction motivation.

#### **1.2.2 Reliance**

In today's industries, where teamwork and collaboration form the prevalent modes of work, reliance on other employees is important. Reliant individuals are not self-sufficient but rather rely on the competence of others. In practice reliance shows as

attentive, active, careful, or deep listening, which serve as effective instruments in genuine dialogue. [6]

### **1.3 Social competence**

Social competence comprises a set of intra- and interpersonal skills facilitating individual's behavior in interaction with others at the workplace, but also in recruitment, when the individual wishes to convey a positive image of him/herself. [7] Skills, be they mental, cognitive, physical or motor in nature, refer to an acquired ability that has improved as a consequence of practice. [8] Emotional regulation constitutes the foundation of interaction ability and the key constituents of interaction ability include assertion, emotive availability and inspiration.

#### **1.3.1 Emotional regulation**

Contemporary personality research regards emotion regulation as a core component of personality functioning and a crucial predictor of psychological adjustment and social competence. Moreover, it accounts for significant variance in individuals' life satisfaction. [10]

#### **1.3.2 Assertion**

Ideally, members of engineering teams are portrayed as argumentative and assertive, which traits contribute to so-called power language that is essential in bolstering confidence and trust not merely within the organization but also at the customer interface. [11]

As its key constituents, clarity, frankness, articulation, errorless message delivery, and verbal directness bear relevance through their association with speaker confidence, eloquence and credibility, and therefore deserve emphasis in this study. People high on argumentativeness are clear, frank, firm, forceful and capable of defending their position, and what is more, not afraid of discussing controversial issues, which all facilitate e.g. conflict management. [12]

#### **1.3.3 Emotional availability**

As the most significant manifestation of emotional availability, empathy refers to perspective taking. It helps individuals navigate with fewer misunderstandings in cross-cultural situations, and in general with people from different backgrounds. It is important to recognize that empathetic individuals do not try to please everyone around them but rather consider thoughtfully others' feelings to make intelligent decisions. [14]

Empathy, both cognitive perspective-taking and emotional understanding of another person's feelings, is a central dimension impacting leader behavior in interaction with others; it contributes to the ability to apprehend the state of mind of those around and to take into account the reasons and logic behind the interlocutor's feelings. Empathy comprises factors such as social self-confidence, sensitivity and flexibility, facilitating true dialogue. [15]

#### **1.3.4 Inspiration**

Inspiration ability tends to elicit cognitive trust in one's colleagues and to promote an image of effectiveness. As a skill, it refers to the extent to which one manages to impact other individuals' thinking and to energize them. [16] It stems from the

individual's passion, commitment, engagement, dedication and shows as joy of work and positive energy that contagiously spreads to the immediate environment.

### 1.3.5 The Social competence model

Figure 1 introduces dimensions of social ability that, when addressed in higher engineering education, would leverage individual engineers' employability and career opportunities in industry.

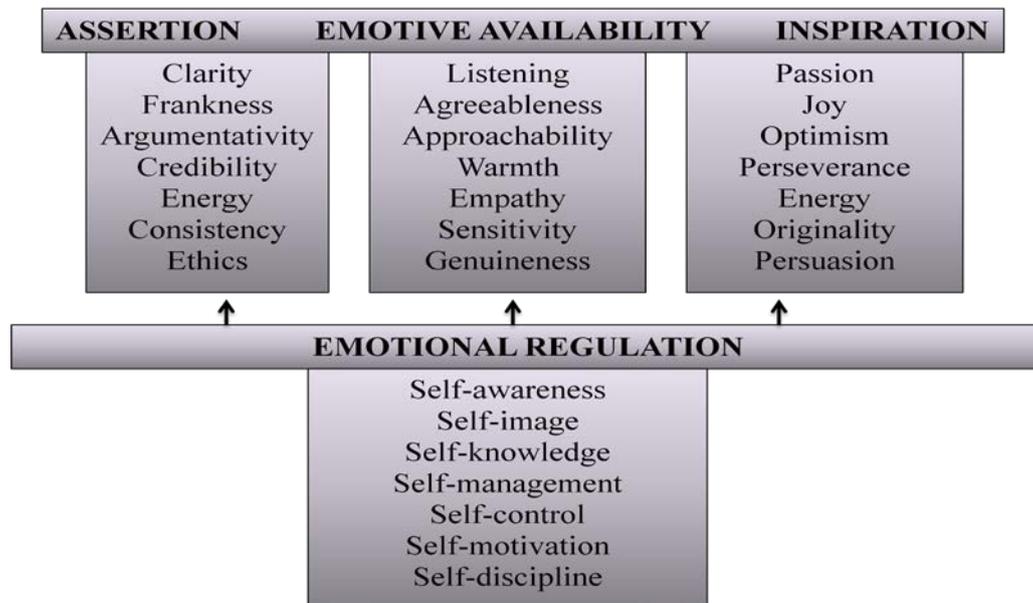


Figure 1. Dimensions of engineers' social competence.

## 2 PEDAGOGY ENHANCING THE BUILD-UP OF PROFESSIONAL EXPERTISE

### 2.1 Foci in working life skills education

Affecting an individual's motivations is important since adults learn what they want to learn. Ideally, education facilitates a permanent capacity change that comprehensively alters individuals' action, habits and competences but also emotions and aspirations. Such a holistic change can be pursued by incorporating not merely knowledge and skills in engineering education but also student motives, values, attitudes and skills, as depicted in Figure 2.

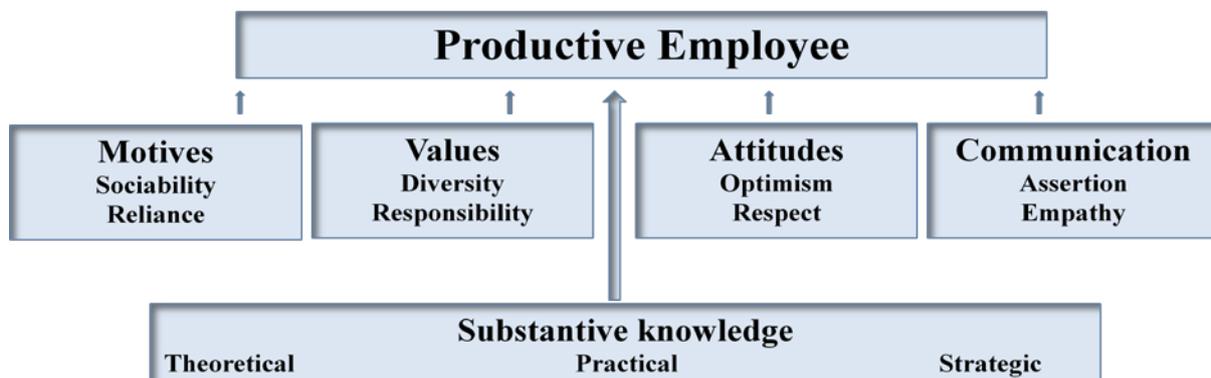


Figure 2. The professional engineer.

## 2.2 Pedagogic methodology addressing professional competences

To bridge the gap between the students's starting level and the envisioned, individually-targeted level of ability, this paper advocates communicative language teaching. Communicativeness in language education is founded on student empowerment (personal autonomy, accountability, self-actualization), self-management techniques (self-theories, attitude change techniques, reflective practice), and teacher immediacy and perceived caring.

Through verbal persuasion, this type of classroom interaction redistributes power in the classroom and allows students to actively build their ownership. The related verbal communication is multileveled, constructive, cooperative, non-judgemental, caring, and spontaneous and focuses on active listening and reception of student feedback. Such emotive communication rids students of fear of judgment and rejection, allowing them to freely present ideas and questions, thereby reducing communication apprehension. [17]

Without controversy, face-to-face instructional classroom methods make a difference in student outputs, measured both as perceived and performed or cognitive learning, as learning and short-term information recall become intensified when their teacher communicates positive regard to the students. Moreover, students have been reported to learn most from teachers who are warm, friendly, immediate, approachable, affiliative, and able to foster close personal relationships, at least when measured in perceived learning which correlates significantly with nonverbal immediacy. [18]

The mechanisms facilitating the positive results remain in question, but what is apparent on the basis of emotional intelligence models is that teachers communicating emotional states to their students influence their emotions to the extent that they catch the teacher's emotional state. Resultatively, positive moods elicit better performance. [19]

Consequently, one of the pivotal pedagogic qualifications for any teacher promoting more effective learning outcomes in the classroom is communication, serving, among others, as a means of bolstering student certainty through application of so-called powerful language. Certain forms of language generate inferences impacting impression formation, resulting in judgments regarding the pedagogue's competence and intellect. Speech devoid of hedges, intensifiers, deictic phrases and hesitations clearly add to teacher credibility and positively affect classroom climate and learning. [20]

Further, immediacy behaviors reduce the perceived psychological distance between the instructor and the students and help build positive and meaningful relationships. Teacher immediacy, whether verbal or nonverbal, promotes overall sensory stimulation, liking and closeness with students. It is also linked with student willingness to comply with teacher requests, perceptions of teacher credibility and learning motivation, associated with both affective and cognitive learning. Teachers can largely benefit from nonverbal immediacy behaviors, for relational messages are best conveyed nonverbally or implicitly, which leaves the verbal channel available for messaging content explicitly. Such nonverbal behaviors include proxemics (distance,

e.g. moving around the classroom while teaching), haptics (touch), vocalic (vocal expressiveness), kinesics (facial and body movement, e.g. smiling), eye contact, chronemics (time spent with students), physical appearance and attire. [21]

Similarly, a teacher's communication variables play a role in leveraging empowerment in the classroom. Relational communication variables such as active listening, openness, constructive feedback, trustworthiness, credibility and immediacy influence students' task motivation and personal involvement. They also promote the alignment and adoption of common values in the classroom, reducing feelings of powerlessness and intimidation while fostering feelings of qualification, meaningfulness and self-confidence, which are preconditions in education subjecting students to vulnerability through public presentations and oral delivery of their own products. [22]

Such immediacy is critical in modelling social competence in the classroom. To become accustomed to expressing themselves, students need to be subjected to classroom interaction regularly - the only way to learn to communicate is by communicating. To perform voluntarily and willingly in front of others, students should feel secure in the group, which is one of the key challenges for the pedagogue. For this, teachers ought to understand that human interaction is motivated on the individual level by the avoidance of shame and pursuit of appreciation. [23]

As another immediacy-derived solution nurturing a safe atmosphere allowing students to move away from self-protection, research proposes perceived caring on the part of the lecturer. The construct of perceived caring draws from three factors in teacher behavior: empathy, understanding, and responsiveness. Empathy manifests itself as concern for student well-being; understanding implies the teacher's ability to comprehend and respect student views, and responsiveness refers to the teacher being attentive and listening to the students and reacting to student needs and problems promptly.

Perceived caring on the part of the teacher, also labelled as good will or positive intent toward students, entails benefits in terms of positive learning outcomes. Teacher behavior that signals a positive attitude towards students' well-being and their best interest influences learning both on the affective and cognitive levels. Nonverbal immediacy, a concept describing positive evaluation of or affect to students, results in a higher rate of class attendance and recall of information, decrease in learning loss, improved motivation and more attentive listening. [24]

### **3 CONCLUSION**

Social competence has emerged as the last resort for organizations searching for new sources of competitive edge and struggling with efficacy targets. Luckily, intellectual or human capital is not in short supply to be fought over merely in the markets – it can be uncovered and discovered in each and every one of us in the form of emotional intelligence and socially competent (self-)leadership. These are known to bring added value: by means of socio-emotional competence we can build stronger interpersonal relationships, be better at motivating others and ourselves, be more proactive and innovative, lead more effectively, function better under pressure, cope with agility in change, and be more at peace with ourselves. Further, such professional qualifications expand one's job opportunities and leverage career development and should therefore find their place in higher engineering education.

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