Communication Skills as a Prerequisite for the 21st Century Engineer

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Abstract

Globalization and fierce competitiveness have become the benchmarks of the world labour market. Daily challenges and increasing demands have broadened roles of electrical and computer engineering experts in such a way that technical expertise and experience are insufficient, i.e. engineers have to develop good communication and soft skills in order to maintain relevance with the global business environment. This research aimed to study the employers’ demands regarding communication skills of their potential employees. 61 employers anonymously participated in the survey whose results were processed with SPSS used for descriptive statistics and Pearson correlation tests. The results pointed to the employers’ high expectations of developed communication skills. The employers request active listeners, proficient first language and English language presenters who will unselfishly share relevant information and participate in rule-based constructive discussions. However, the employers can be categorized in two groups – conservative employers who demand the highest level of professionalism in both spoken and written communication and employers more tolerant of mistakes and an informal style.
Additionally, employees are expected to adopt e-mail etiquette and exhibit excellent grammar and style in both written and oral communication accompanied by using appropriate nonverbal communication methods. Hence, higher education institutions should design new or revise current curricula by implementing communication skills to meet the employers’ demands.

**Keywords:** Communication Skills, Employers, Engineering Graduates, SPSS.

1. Introduction

Education is one of the key elements for facilitating sustainable development. Due to dramatic changes brought by globalization, curricula are required to be constantly upgraded to keep up with current developments and industrial needs. There tends to be a growing expectation that universities should meet the requirements and expectations of the industry and educate global engineers who will not only be tech-savvy but also skilful in non-technical fields. Engineering graduates are required to possess an array of skills to be competitive and maintain relevance with the global environment. Communication skills are a salient component of ever-increasing skills recognized by the industry and academia alike. Engineers equipped with effective communications skills are assets to employers who are searching for employees able to play multiple roles to promote business and their company. Being multifaceted in its nature, communication comprises of listening, speaking, writing, presenting and teamwork skills. The expectations for the 21st century engineer do not solely include sitting behind a computer screen and using his technical expertise; rather, a modern engineer is required to actively collaborate with fellow engineers and the industry, virtually exchange ideas and information and confidently present his work thus crossing (inter)national, cultural and possibly personal boundaries with the final aim of carrying out business successfully and maintaining relevance on the global labour market. Therefore, in order to provide employers with a profile of engineers they demand, higher education institutions should work closely with prosperous employers, find out their demands and revise curricula accordingly.
2. Literature overview

Education is labelled as one of the pivotal strategies for fostering sustainable development. Constant upgrading, shift in thinking and innovative activities of both individuals and institutions have to constantly been undertaken in order to ensure development, which is a central point of education. There is an ever-growing demand and expectations that higher education institutions directly meet the needs of industry, i.e. universities are expected to educate graduates in both field and non-field skills. When speaking about technical sciences, the industry has set standards to be delivered global engineers who are not only competent in technical but also in non-technical skills such as communication, interpersonal or team-work skills (DEETYA 2000; Dannels, 2003; Lee 2003; North and Worth, 2004, Raybould and Sheedy, 2005; Raftopoulos, Van der Westhuizen and Visser, 2009; Hinchliffe and Jolly, 2011; Ahmad et al., 2014). Furthermore, several authors’ findings suggest that employers, when evaluating their employees’ skills, put an even greater emphasis on their communication skills than they do on their technical skills (Koprowska, 2006; Zepke and Leach, 2010; Pinetech, 2012), which may come as a surprise to professors and management of higher education engineering institutions. To paraphrase, employers expect a great deal of communication skills, such as oral communication, written communication, teamwork skills, presentation skills, global/cultural awareness, leadership communication and interpersonal communication (Matturro, 2013; Halil Gerek and Efe Efeoglu, 2015).

North and Worth (2004) identified interpersonal skills as the most frequently required competencies in newspapers ads for entry-level jobs. Peterson’s (1997) research strongly indicates that communication skills of applicants are essential for the success at job interviews. Also, the author finds that many applicants lack effective communication skills, particularly in the areas of topic relevance, clarity of response, grammar and response feedback. Maes, Weldy and Iceogole (1997) present the results of two studies which reveal that “oral communication is the most important competency for college graduates entering the workforce”.
Kakepoto et al.’s (2012) study indicates that “oral communication skills such as oral presentation, participation in meeting, conversation, discussion, and negotiation skills play pivotal role for engineers at workplace”. That being said, the importance of communicating effectively at workplace should be grasped seriously (Kotak and Upadhyay, 2015).

Technical knowledge is indeed crucial in engineering education. However, if we educate an engineer who is highly knowledgeable in engineering, but poorly able to communicate his ideas and knowledge within his work environment, we are missing the opportunity to educate an engineer well-adjusted to the needs of a modern job market (Jensen, 2000; Clement and Murugavel, 2015). James and James (cited in Kakepoto et al., 2012) state that technical skills used to be vital in engineering workplaces but the latest findings suggest otherwise. Even though engineering education curriculum nowadays includes communication skills education, the emphasis is still largely placed on acquiring technical knowledge thus marginalizing obtaining communication skills. Nevertheless, contemporary work market requires rethinking of this approach. Effective communication has become essential for success in a global business setting (Jaderstrom and Schoenrock, 2008).

In this context, it is relevant to present ABET Engineering Criteria 2000, EC2000 (Baum, 2000). ABET stands for Accreditation Board for Engineering and Technology, Inc. It is an American non-governmental organization that accredits “college and university programs in the disciplines of applied science, computing, engineering and engineering technology at the associate, bachelor and master degree levels”. Two of the eleven key learning outcomes required by the EC2000 are an ability to communicate effectively and an ability to function in multidisciplinary teams. Evidently, there is an ongoing change in an engineering education paradigm. This paradigm shift points to the greater awareness of the importance of implementing communication skills in the process of engineering education. The American Secretary’s Commission on Achieving Necessary Skills report identified interpersonal skills and basic communication skills, including speaking and listening, as two of eight essential competencies necessary for success in the workplace (North and Worth, 2004).
Awareness of the important role of communication skills in professional, as well as in academic achievement have gradually been raised in numerous higher education institutions. As cited in Missingham (2006), Adams and Missingham (2006) highlight the need for improving communicative competence in engineering graduates. Some authors present the idea of communication skills development as a life-long learning process (Riemer, 2002; Rainsbury et al., 2002; Halil Gerek and Efe Efeoglu, 2015), hence the role of graduate students’ education in this context is of great importance.

Nowadays, engineers education curriculum usually includes a communication skills class, but an integrative approach (developing communication and technical skills simultaneously) to this matter emerges as a better solution. Donnel et al. (2011) suggest that “communication assignments that engineering students perform in college significantly differ from the writing situations that engineering graduates encounter in industry”. As reported by Missingham (2006), the School of Mechanical Engineering at the University of Adelaide implemented a successful integrative curriculum aiming to develop communicational skills and raise awareness of the social, intercultural and environmental contexts engineers work in. This interdisciplinary approach to the teaching and learning of communication skills (Artemeva, Logie and St-Martin, 1999) is so far implemented by a relatively few engineering higher education institutions; however, the number of such institutions has been increasing lately. Artemeva, Logie and St-Martin (1999) present the strategy undertaken by some Canadian universities. These universities recognized that the engineering discipline has specific communication requirements and accordingly moved “from general technical communication service courses to discipline-specific courses designed for engineering students”. The authors presented the case of Carleton University. This university introduced a mandatory communication skills course for the first and second year engineering students focusing on developing skills which would help students successfully integrate into engineering school environment, as well as help their transition to the workplace. These skills are acquired through practicing writing skills in the engineering context and interactions with more experienced writers (senior engineering students, teaching assistants and instructors).
There is a similar example at the Massachusetts Institute of Technology (MIT) presented by Einstein (2002). MIT brings a new approach implemented in the School of Civil Engineering as a reaction to the notion that universities’ curricula are much unrelated to practical work. The new approach demand regular oral, written and illustrated presentations from students. Missingham (2006) suggests that “promoting a shared agenda between language and engineering disciplines... this may also promote student recognition of the importance of communication in engineering”. Since the labour market and industry have put forward additional demands, higher education institutions are to revise their curricula and equip their students with necessary non-technical skills thus making them highly competitive on a modern job market.

3. Methodology

The Faculty of Electrical Engineering, Computer Science and Information Technology Osijek (hereinafter FERIT) – a constituent unit of Josip Juraj Strossmayer University of Osijek – established a portal STUP for students studying at FERIT and employers working in the fields of electrical and computer engineering. The rationale for establishing the portal was to set up a network of students and employers. The portal is a place for employers to publish open calls for students’ practical work, vacancies, scholarships, research and writing thesis opportunities. Joining the portal and signing a bilateral contract is optional. This research aimed to survey employers who joined the portal STUP in order to find out which communication skills, if any, they are looking for in potential employees.

The methods used in this research are a case study, which includes a group of employers cooperating with FERIT, a quantitative method for processing the research results and qualitative for their interpretation. The survey was created in Google Docs and it was composed of 40 closed-ended questions divided in five branches – listening skills, speaking skills, team communication skills, writing skills and presentation skills. The first question (field of expertise) was a multiple choice, while all other questions were created in the form of a linear (Likert-type) scale ranging from 1 (not important at all/not bothered at all) to 5 (absolutely essential/intolerable).
Using the survey, we aimed to find out the employers’ opinion on communication skills they look for in potential employees. The employers were asked to rate the importance level of a certain subskill they demand from potential employees. The questions were carefully designed to cover the broadest possible range of skills the employers might look for. However, the closed-ended nature might have eliminated some possible unanticipated answers. Considering the previous experience with the employers, their lack of free time or will to engage themselves in time-consuming activities, we opted for the survey with closed-ended questions whose results can later on be upgraded with interview questions. Participating in the survey was optional and anonymous. 61 employers participated in the survey, which represented 50% of the total population at the time of conducting the survey. The results were processed with the software for statistical analysis SPSS which was used to carry out descriptive statistics and the Pearson correlation test.

The following research questions were addressed:

1) Which communication skills are required by the employers, i.e. how important are specific subskills in the employers’ viewpoint?

2) Is there a correlation between the surveyed skills? Which specific subskills do the employers cumulatively demand and what does a correlation tell us about a profile of the employers?

4. Results and discussion

As a prerequisite for asking more specific questions, the employers were asked if they require developed communicational skills in addition to engineering ones. The results shown in Table 1 clearly illustrate the employers’ opinion on the importance of communicational skills.
Table 1. Employers’ demand of developed communicational skills

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<th>Valid</th>
<th>Frequency</th>
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<tbody>
<tr>
<td>Not important at all</td>
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</tr>
<tr>
<td>Of little important</td>
<td>1</td>
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<tr>
<td>Of average importance</td>
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</tr>
<tr>
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<tr>
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<tr>
<td>Total</td>
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The employers believe that communication skills are very important (39.3%) or absolutely essential (49.2%) thus being in accord with a growing body of research (Grapsas and Ilić, 2001; Morreale, Shockley-Zalabak and Whitney 2009; Dunbar, Brooks and Kubicka-Miller, 2006; Schnell, 2006; Artemeva, 2008). It is clear that in addition to being technically competent (hard skills), graduates are required to possess relevant soft skills for effective workplace communication purposes and to be competitive and marketable in the industry. To paraphrase, developed communication skills can be considered as a career enhancer (Polack-Wahl, 2000).

As mentioned, the survey was divided in five sections, namely listening skills, speaking skills, team communication skills, writing skills and presentation skills. Hence, the survey results will be categorized and discussed accordingly with a selection of survey questions presented.

4.1. Listening skills

Listening is the ability to receive and interpret messages during the communication process. That being said, listening can be defined as an active process requiring a focus and concentrated effort of a fully involved listener. According to Adler et al. (2001), adults spend 70% of their time engaged in some kind of communication. Out of 70%, 45% is spent on listening, 30% on speaking, 16% on reading and only 9% on writing, which points to the importance of developing listening skills.
The employers from our study require a high level (88.5%) of listeners’ undivided attention, i.e. they do not tolerate texting, surfing on the Internet or talking on a phone during someone’s speech. In addition to listeners’ full attention, the employers demand that listeners respect turn-taking (88.8%).

During the process of listening, a listener can engage himself by using nonverbal signs of nodding or making different facial expressions thus showing his opinion on the matter to a speaker. Also, a listener can show his appreciation, attention or provoke a speaker by making eye contact with him. The results of these two questions are merged in Table 2.

Table 2. Importance of employees using nonverbal signs to show they are listening and them making eye contact with a speaker

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<td></td>
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<tr>
<td>Of little important</td>
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<td>4.9</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Of average importance</td>
<td>11</td>
<td>18.0</td>
<td>10</td>
<td>16.4</td>
</tr>
<tr>
<td>Very important</td>
<td>27</td>
<td>44.3</td>
<td>28</td>
<td>45.9</td>
</tr>
<tr>
<td>Absolutely essential</td>
<td>18</td>
<td>29.5</td>
<td>21</td>
<td>34.4</td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>100.0</td>
<td>61</td>
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The results indicate that employers highly value showing nonverbal signs (73.8%) and making eye contact with a speaker (80.3%). Listening does not imply paying attention solely to a story; rather, it involves focusing on how a story is told, a speaker’s use of body language and managing his voice. A listener should be aware of both verbal and nonverbal messages because appropriate understanding is a combination of the two. Research (Mehrabian, 2009; Burgoon, Guerrero and Floyd, 2016) have shown that 70-90% of the entire communication is nonverbal. Consequently, sending nonverbal messages is crucial in communicating subliminal messages and gleaning useful information. One of the reasons for watching a speaker during his presentation is politeness.
Additionally, by nodding or making facial expressions, a listener sends messages of (dis)approving. Simultaneously, a listener obtains visual data from a speaker. Also, making eye contact contributes to listening being more personal and direct even though this aspect is more relevant for a speaker. Since there is a close natural connection between a listener using nonverbal signs and a speaker’s use of body language, we examined the correlation with the Pearson correlation test. The results \[ r (61) = .427, p = .001, \text{two-tailed} \] point to a positive statistically significant correlation, i.e. the employers demand that their employees use nonverbal signs when they are both listeners and speakers. Furthermore, the same correlation was tested for making eye contact and the results \[ r (61) = .662, p = .000, \text{two-tailed} \] are identical – the employers request making eye contact in both a listening and speaking role.

The ability to actively listen and grasp both verbal and nonverbal messages is the cornerstone of communication. Our results have shown that the employers are very demanding with respect to listening skills. They require that an employee is a well-rounded and an engaged listener. To put it differently, the employers expect that employees can communicate in back-and-forth manner engaging both themselves, their fellow colleagues and superiors.

4.2. Speaking skills

Even though an engineer primarily interacts with technology, he has to communicate with fellow engineers, team members, supervisors and customers. Surveying business graduates workplace communication skills in Monash University, Crosling and Ward (2002) found that 84% employers pointed to the importance of speaking skills. In the same vein, Gray (2010) carried on a survey on communication skills for accountancy graduates in New Zealand and found that 91% of respondents considered speaking skills as very important. Furthermore, according to Sageev and Romanovski (2001) and Riemer (2002), technical expertise is not useful unless it is presented with an excellent standard of communication skills. Therefore, in addition to technical know-how, engineers should have highly developed speaking skills.
Since the official language of the surveyed subjects is Croatian, we were interested in finding out whether the employers demand the use of the standard Croatian language. Also, we were curious about the employers’ opinion on the use of the advanced level of the English language.

Table 3. Importance of employees using a standard Croatian language and the advanced level of the English language

<table>
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<th>Frequency</th>
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<tr>
<td>Not important at all</td>
<td>2</td>
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</tr>
<tr>
<td>Of little important</td>
<td>2</td>
<td>3.3</td>
<td>2</td>
<td>3.3</td>
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<tr>
<td>Of average importance</td>
<td>17</td>
<td>27.9</td>
<td>9</td>
<td>14.8</td>
</tr>
<tr>
<td>Very important</td>
<td>25</td>
<td>41.0</td>
<td>29</td>
<td>47.5</td>
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<tr>
<td>Absolutely essential</td>
<td>15</td>
<td>24.6</td>
<td>21</td>
<td>34.4</td>
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<tr>
<td>Total</td>
<td>61</td>
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As illustrated in merged Table 3, the employers believe that the use of the standard Croatian language is very or extremely important (65.6%), which comes as a bit of surprise given the highly anglicized field. Simultaneously, the employers request the advanced level of the English language (81.9%) thus being in line with similar international research (Riemer, 2002; Kassim and Ali, 2010; Seetha, 2012; Rajprasit et al., 2014). Interestingly, there is no statistically significant correlation recorded with the Pearson correlation test \[r \ (61) = .101, p = .439, \text{two-tailed}\], which suggests that there is no significant overlapping between the employers who require the use of the standard Croatian and advanced English language. Furthermore, the employers’ opinion on using slang during speeches is divided – 37.7% think it is of no or little importance, while 62.3% think it is very of absolutely essential. Conducting the Pearson correlation test on using the standard Croatian language and slang \[r \ (61) = -.474, p = .000, \text{two-tailed}\], it is obvious that those employers who demand the usage of a standard native language do not tolerate the use of slang or jargon.
The employers want that employees are relaxed when talking to their colleagues or superiors (93.5%); however, casual speaking do not correlate with using slang \[ r (61) = .274, p = .055, \text{two-tailed} \], i.e. even when speaking casually, employees are expected to use a standard language. Additionally, the employers highly value a clear (96.8%) and a concise (93.4%) way of speaking. Given the high percentages for these two variables, a statistically significant correlation between them \[ r (61) = .483, p = .000, \text{two-tailed} \] comes as no surprise. As Jaderstrom and Schoenrock (2008) claim, clear and concise communication is essential for achieving success in business environment. To put it differently, the ability to effectively communicate draws a line between an average and excellent engineer. Being successful in any field implies understanding how to communicate effectively. The industry recognizes the importance of communication skills for engineers (Dannels, 2002; Korte, Sheppard and Jordan, 2008); however, there is conclusive evidence that engineering graduates lack the required standard of communication skills (van Horn, 1995; Jensen, 2000). Contradictory to the stereotypical views that engineers solely deal with technology at workplaces, Tilli and Trevelyan’s (2008) research recorded that engineers spend 60% of their worktime speaking with their colleagues and supervisors. Hence, successfully performing tasks is tightly connected with effective speaking skills. Moreover, engineers equipped with effective speaking skills are usually given more responsible assignments by managers. Also, they can be promoted more easily since they are considered as more productive employees.

4.3. Teamwork skills

Teamwork is an essential constituent element of workplace success. Teamwork skills can be defined as the ability to work effectively as a team member understanding the team dynamics. Every member of a team has a specific role to perform in order to accomplish tasks. Since the teamwork implies cooperating with other people and building relationships, the following set of skills has to be developed:

- Ability to work cooperatively;
- Provide your own ideas and suggestions for improvement;
- Respect other people’s opinions, preferences and suggestions;
• Plan ahead, organize your tasks and deliver on time;
• Participate in team decision-making. 

A team leader plays the role of a team facilitator; assigns tasks, supervises tasks completion and makes sure that they are successfully and timely completed. Whenever possible, a consensus should be reached by team members communicating and discussing potential differences in opinions. Hence, communicating, sharing relevant information and discussing ideas are crucial for healthy teamwork environment. There is a growing body of research examining employers’ perceptions of employability skills which recent graduates should possess. The research carried out by the UK Commission for Employment and Skills in 2009 has found that employers highly value transferrable skills among which are teamwork skills. Similarly, two years later, the University of Glasgow SCRE Centre and Edge Foundation (Lowden et al., 2011) conducted interviews with employers and higher education institutions and found that employers require a combination of transferrable skills the first of which are teamwork skills. A recent 2014 analysis on Australian employers by Harder, Jackson and Jane shows that these requests are universal. However, the authors report employers’ dissatisfaction on recent graduates’ teamwork skills.

According to the workplace experts interviewed by Forbes (2013), socializing with colleagues is vital for one’s career because it builds and strengthens relationships creating a positive and productive work atmosphere. The employers from our research were asked whether they think it is important for a newcomer to befriend with co-workers. 42.6% of the employers believe it is very important and 54.1% think it is absolutely essential. Since a modern workplace has become a “home away from home”, building relationships makes employees happier, more productive and more successful overall. Employees casually chatting during coffee breaks does not bother 70.5% and slightly bothers 16.4% of the employers. Furthermore, 31.1% of the employees believe that talking behind a colleague’s back is very problematic, while 60.7% do not tolerate it at all. All these results point to the employers’ wish to create a healthy workplace relationship. Interestingly, there is no correlation between chatting during breaks and talking behind a colleague’s back \[ r (61) = -.046, \ p = .725, \ \text{two-tailed}.\]
To paraphrase, the employers do not perceive casual chats during breaks as opportunities to vilify co-workers. A team can function efficiently if all members of a team do their assignments and cooperate if an assignment is to be carried out jointly by more members. Hence, team members have to communicate and share relevant information. The surveyed employers recognise the importance of sharing information. Specifically, 19.7% think it is very important and 78.7% believe it is absolutely essential.

Conversations at workplaces build relationship among employees. In addition to a casual and formal conversation, a discussion is an important aspect of workplace communication. It provides an opportunity to share your ideas and get an insight into a colleague’s opinion on a matter. Also, junior co-workers can acquire knowledge from more experienced co-workers. As illustrated in Figure 1, some employers think it is very problematic (26.2%) or intolerable (16.4%) that employees speak simultaneously. Furthermore, 44.3% of the employers think it is very problematic and 26.2% think it is intolerable for employees to interrupt each other while speaking which means that even during discussion, rules of turn-taking have to be obeyed.

**Figure 1. Employers’ perception of employees speaking simultaneously**
Statistically significant positive correlations shown in Table 4 clearly illustrate that those employers who do not tolerate employees speaking simultaneously do not tolerate interrupting \([r (61) = .530, p = .000, \text{two-tailed}]\) or finishing other person’s sentences \([r (61) = .600, p = .000, \text{two-tailed}]\) and vice versa. These correlations support our claims that even during discussions, rules of turn-taking must not be violated.

Table 4. Correlation of employees speaking simultaneously, finishing other person’s sentences or interrupting each other

<table>
<thead>
<tr>
<th></th>
<th>How much does it bother you when employees speak simultaneously?</th>
<th>How much does it bother you when your employees interrupt each other?</th>
<th>How much does it bother you when your employees finish each other’s sentences?</th>
</tr>
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</table>

**. Correlation is significant at the 0.01 level (2-tailed).

Teamwork skills are one of the fundamental skills employers look for in prospective employees. Graduate recruiters’ task is to find employees who can encourage team members to reach their full potential, contribute with new ideas and accept other people’s opinions and ideas. To paraphrase, employers search for employees who can collaborate, inspire and compromise. The data from our survey illustrate that the employers indeed require team players.
Teamwork skills can be acquired in extracurricular activities, such as team group work and sports. Since teamwork skills can be demonstrated in specific situations after an employer hires an employee, research have shown that employers frequently check employees’ CVs for evidence of a group type of activities (Adnett and Slack, 2007; Tchibozo, 2007), which might serve as a guiding point when writing a CV.

4.4. Writing skills

Writing skills are important aspects of communication because they facilitate communicating a message with ease and clarity to a large group of people. Sound writing skills are advantageous for all professionals across a wide range of industries. Even though a special emphasis is put on STEM education nowadays, writing is gradually becoming a sought-after skill in the labour market. Effective business writing opens doors and sets an individual apart from the crowd. It indeed can help an employee move up the corporate ladder giving him a distinct competitive edge. Therefore, developing and/or brushing up on writing skills is essential for both employees and employers.

Since the world has become a global village, running business internationally is a natural thing. In order to confidently and efficiently communicate with both local and international colleagues, employees use e-mails whose ubiquity is one of the primary reasons why writing skills have become so crucial. Due to a variety of available sources, e-mail etiquette and well-versed employees are highly expected. In addition to the style and grammatical correctness, e-mail etiquette includes a proper structure (professional salutation, clear subject line, signature block, etc.). That being said, we were interested in finding out the employers’ opinion on using e-mail etiquette. 31.1% of the employers believe it is very problematic and 31.1% it is intolerable for their prosperous employees to use an inadequate structure in their e-mails. An e-mail is often the first impression a receiver gains, so a poorly structured e-mail results in a bad first impression, which employers cannot afford. This result suggests that if inexperienced in structuring professional e-mails, graduates should study e-mail etiquette rules and train themselves in professional writing.
E-mail is a preferable and most frequently used means of communication in the 21st century. Even though communication is nowadays undeniably trending towards the casual end of spectrum, e-mail communication still requires professionalism. Moreover, cover e-mail messages are considered to be pre-screening for a job interview. Therefore, writing a grammatically correct e-mail is very important for employers’ first impression. In addition to e-mails, employees occasionally write memos, leaflets, and texts on an official website, i.e. materials conveying an impression about a company, employees and the work itself. So, in order to obtain a good impression and encourage someone to contact your company, texts have to be grammatically correct. The employers from our study recognize the importance of proofread texts. 49.2% of the surveyed employers believe it is very important and 42.6% think it is absolutely essential to have literate employees who will be able to present and advertise their work writing grammatically correct texts as illustrated in Figure 2.

Figure 2. Importance of employees using grammatically correct texts
The results clearly indicate that exhibiting good grammar is vital for the employers. In addition to creating and maintaining an impression to both their employers and potential clients, employers might demand good grammatical abilities because of a potential correlation between making fewer grammatical mistakes and fewer work-related mistakes. To put it differently, employees who are diligent about their grammatical mistakes in writing might tend to be diligent about engineering things they do.

A standard language is a language variety that has undergone a process of standardization and is used for public purposes. Typically, the content on a website, official e-mails, promotional materials and contracts should be written according to a standard variety of language. Jargon, on the other hand, is a type of language used in a particular context and by a closed group of speakers. It is usually associated with a certain trade or profession. The main characteristic of jargon is specialized vocabulary which is almost incomprehensible to outgroup individuals. Since technical vocabulary is one of the prototypical examples of jargon, we were interested in finding out if the employers mind the use of it in writing.

Table 5. Employees using informal language and jargon in their writings

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<th>Frequency</th>
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The results, presented in Table 5, show that the employers require a high level of formal language in their employees’ writings. However, even though it is high, it is not as high as with the employers’ demand on the usage of grammatically correct texts. This might be explained by the nature of the question.
Namely, the employers do demand the use of standardized language probably in correspondence with clients and official representation of the company but simultaneously they are relatively tolerant to the use of jargon – technical vocabulary – when appropriate. Technical experts using jargon may be perceived as a means of social aspiration (a way of showing one’s expertise) or social exclusion (a way of reinforcing barriers for outgroup individuals). If perceiving jargon this way, the employers might feel more tolerant about their employees using it. High percentages of the three mentioned questions point to a possibility of a correlation so we decided to check it. There is a strong statistically significant correlation of all three questions as given in Table 6. The results show that the employers demand a formally structured e-mails which will be grammatically correct and stylistically appropriate with probably the final aim of creating and maintaining professional impression.

Table 6. Correlation of a formal structure, grammar and style in writing

<table>
<thead>
<tr>
<th></th>
<th>How much does it bother you when your employees do not use a formal structure in emails?</th>
<th>How important is that your employees use grammatically correct texts?</th>
<th>How much does it bother you when your employees use informal language and jargon in their writings?</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much does it bother you when your employees do not use a formal structure in emails?</td>
<td>Pearson Correlation 1,452**, Sig. (2-tailed) .000, N 61</td>
<td>Pearson Correlation 1,519**, Sig. (2-tailed) .000, N 61</td>
<td>Pearson Correlation 1,000, Sig. (2-tailed) .000, N 61</td>
</tr>
<tr>
<td>How important is that your employees use grammatically correct texts?</td>
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<td>Pearson Correlation 1,519**, Sig. (2-tailed) .000, N 61</td>
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</tr>
<tr>
<td>How much does it bother you when your employees use informal language and jargon in their writings?</td>
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<td>Pearson Correlation 1,519**, Sig. (2-tailed) .000, N 61</td>
<td>Pearson Correlation 1,000, Sig. (2-tailed) .000, N 61</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
Another thing we were interested in finding out was whether the employers mind when their employees use the English language in formal communication since it is not the official language. The results presented in Figure 3 show that the employers are fairly tolerant of employees using Anglicism. Given that electrical and computer engineering are highly anglicized fields, this comes as no surprise. People may find it easier to use an anglicized word rather than finding a suitable translation. Moreover, translation of electrical and computer engineering vocabulary is quite problematic and usually sound very unnatural in Croatian, which is an additional reason of Croatian speakers, especially technical experts, choosing Anglicism.

**Figure 3. Employers’ perception of employees using Anglicism**

Given the distribution of percentages in the previous question, we were inspired to examine if there are any correlations between the employers’ demand of a formal structure, grammar correctness, style and the use of Anglicism. According to the results obtained by the Pearson correlation test, there is a statistically significant correlation between the use of Anglicism and a formal structure in e-mails \[r\_\text{(61)} = .372, p = .003, \text{two-tailed}\], i.e. those employers who require formal structuring of official e-mails do not tolerate the use of Anglicism.
Similarly, the employers who do not tolerate the use of informal language in employees’ writing do not tolerate the use of Anglicism \([r (61) = .367, p = .004, \text{two-tailed}]\). On the other hand, the employers who permit the usage of Anglicism are more tolerant to employees’ making grammatical mistakes in their writings \([r (61) = .141, p = .280, \text{two-tailed}]\). To summarize, there are two groups of employers – the ones who are stricter and demand the highest level of professionalism and proficiency and the ones who are more tolerant and casually run their business.

Communication in social networks is characterized by the use of abbreviated newly composed words and emoji. An emoticon is a font-based representation of human faces, while an emoji is a graphical counterpart of an emoticon. Despite it is not advisable to use emoticons or emoji in formal communication, they have gradually become an integral part of e-mail communication. However, this does not mean that employers tolerate the use of emoticons or emoji, so we decided to check their opinion on the issue and presented the results in Figure 4.

**Figure 4. Employers’ perception of employees using emoticons and/or emoji in their e-mails**
The results suggest that the employers are tolerant when it comes to the use of emoticons and emoji since 47.5% of them are slightly or not bothered at all. These results may be connected to the field of expertise of the surveyed employers. The employers are probably more used to the Internet language, hence more tolerant to the use of emoticons and emoji. In spite of the informal nature of emoticons and emoji, their usage in formal writings might not be completely negative. Emoticons and emoji are used to express people’s emotions; they can help convey a tone and avoid misunderstandings. They are a tool used to communicate nonverbal communication and clarify an emotional undertone of a message. Also, they can help a person appear more friendly and appreciative.

When deciding whether to use emoticons and emoji in e-mails, the best rule of thumb is to think about the impression that wants to be gained. If an employee wants to convey an impression of friendliness and warmth, it is acceptable to use them. If, on the other hand, an intended impression is professionalism, competency and power, emoticons and emoji are not advisable.

Based on our correlation results on the formal structure, language, style and the usage of Anglicism, we concluded that there are two groups of employers – more demanding and casual ones. So, we decided to examine if there are any significant correlations between the formal structure, language, style and the usage of emoticons and emoji. The Pearson correlation results support our claim on the two groups of employers. Those employers who do not appreciate the use of emoticons and emoji do require that their employees use a formal structure in their e-mails [r (61) = .452, p = .000, two-tailed] and are very bothered when employees use informal language in their writings [r (61) = .402, p = .001, two-tailed]. In comparison, those employers who are more tolerant to informality and the use of emoticons and emoji are also more tolerant to employees making grammatical mistakes in their writings [r (61) = .054, p = .680, two-tailed]. Our results illustrate that there is an impetus for advanced writing skills in the fields of electrical and computer engineering. In addition to engineering tasks, employees are required to communicate with their colleagues, managers and clients via e-mail, post news and information on an official website and design manuals and memos. Additionally, advanced writing skills build corporate relationships and convey impressions of employees and a company itself.
That being said, developing and demonstrating advanced writing skills is essential since writing can serve a threshold skill for an employee selection and promotion.

### 4.5. Presentation skills

Presenting information concisely, clearly and effectively is vital in order to get your message across. In addition to presenting the content of work, presentation skills also include the ability of persuasion, i.e. the intellectual ability to speak convincingly to internal or external and unsophisticated or knowledgeable audience. This calls for verbal deftness and stylistic versatility of presenters. Furthermore, developed presentation skills do not solely imply the art of persuading and presenting; rather, it includes the proper use of visual aids, consumer-based delivery management, demonstrating dynamic body language techniques and handling audience’s questions, so we decided to check whether the employers are aware of the complexity of presentation skills.

As expected, the employers are very demanding when it comes to creating a clear and concise presentation, i.e. 42.6% believe it is very important and 44.3% that it is absolutely essential for an employee to be able to make a good presentation. Messages containing both narrative and visual elements are more efficient that the ones comprising solely of the verbal content. Furthermore, Power Point and Prezi presentations have de facto become presentation tools for the majority of presenters. Since these tools are easy to handle, it comes as no surprise that the employers expect that employees can confidently use the tools in order to effectively present results and promote their ideas. Additionally, 55.7% of the employers think it is very important and 36.1% that it is absolutely essential that a presenter can handle a presentation, which implies that the employers are intolerant of a presentation being made by someone other than a presenter. To paraphrase, a lack of technical expertise in handling a presentation, false beginnings or the inability to explain the content are not tolerated by the employers.
Even though the verb to present includes the art of presenting something, presenters very frequently decide to read a prepared material. However, reading and presenting are two approaches that convey a different message. The employers from our study do not appreciate reading during a presentation since 47.5% believe it is very important and 32.8% that it is absolutely essential for an employee to thoroughly prepare and present rather than read materials. Reading and presenting from the perspective of a presenter, and listening to a read or presented issue from the audience’s perspective are cognitively different. When a person reads materials, he tends to focus his thoughts on his notes and consequently loses a contact with the audience. A reader’s voice is usually reduced to a monotone, which results in listeners losing interest fast. On the other hand, when a person presents materials, his delivery is more enthusiastic and energetic thus more actively engaging the audience.

Public speaking is one of the people’s greatest fears and inherently an edgy experience. Even experienced speakers feel nervous before speaking publicly because a presenter is put on the spotlight and has to deal with both his and the audience’s expectations. Everyone has a different level of stage fright, i.e. it can range from slight nervousness, which is known only to a presenter, to a presenter being incapacitated by anxiety and petrified with fear. Thoroughly researching a topic and practicing before delivering a speech might help reduce the level of anxiety. Knowledgeability about the topic and practice will make a presenter more relaxed and consequently enhance his performance. A relaxed presenter is demanded by the surveyed employers - 57.4% believe it is very important and 27.9% think it is absolutely essential for an employee to be relaxed during a presentation. In addition to a detailed preparation, relaxed and natural presentation is to be achieved by presenting rather than reading a prepared material \([r (61) = .533, p = .000, \text{two-tailed}]\).

One part of communication is nonverbal. When speaking before a group, the audience judge the content of one’s message (verbal communication) but also the means of communicating that message (nonverbal communication). A presenter’s body can be used as a powerful instrument in sending a message of sincerity, enthusiasm and eagerness.
Additionally, a presenter’s face communicate his emotions and attitudes even more clearly than his words. According to Mehrabian (2009), 55% of speaker’s credibility is attributed to body language, 38% to the tone of one’s voice and only 7% to actual words. The audience can read the feelings of anger, confusion, surprise, fear, etc. from a presenter’s face. In spite of public speaking anxiety, a presenter should try to make eye contact with the audience in order to share his feelings and make his presentation conversational, direct and personal. A nonverbal element of presentation is recognized by the employers since 47.5% think it is very important and 31.1% it is absolutely essential that an employee makes a nonverbal contact with the audience thus engaging them in presentation. Public speaking can be defined as amplified conversation and just as in conversation, the audience expect that a presenter will make eye contact and speak directly to them. A failure to make eye contact might be interpreted as insincerity and disinterest resulting in misinterpretation of a message. In addition to making eye contact, the employers believe that body language (hand gestures, controlled walking around the allotted space, etc.) is very important (60.7%) or absolutely essential (16.4%). Inadequate body language contributes to the audience’s opinion about a presenter. Hiding one’s hands, crossing arms or fidgeting with fingers will display a message of nervousness, disinterest or insincerity. Consequently, the audience will not remain attentive and will forget messages even during one’s presentation. Controlled walking contributes to the effectiveness of one’s messages. If a presenter stays on the allotted space, he may be perceived as inexperienced or terrified. If, on the other hand, a presenter walks back and forth uncontrollably, he might annoy and distract the audience from listening. So, controlled movement will keep the audience interested and focused. Given the high percentage of the tone of voice has in sending a message, we studied if the employers are aware of it. 59% of the employers perceive the appropriate tone as very important and 19.7% as absolutely essential. The tone of voice, pitch, volume, intensity and vocal sighs can affect both sending and receiving a message. They reveal presenter’s emotions and the importance of certain words he emphasizes. Therefore, in order to attract and keep the audience’s attention, a presenter has to control his tone, pace, pitch, volume, resonance and enunciation.
Finally, handling questions is an important part of the presentation. The employers from our study agree with that since 37.7% of them think it is very important and 55.7% that it is absolutely essential that an employee is able to handle questions related to the topic he presents. Many presenters are afraid of the questions and answers session even more than the presentation part because they cannot know what to expect thus losing a control. Despite an excellent preparation, some questions may be raised because people process information differently. The anxiety level can be reduced by treating questions as an essential part of the presentation. Also, anticipating questions and preparing additional clarifications may ease the nervousness of a presenter.

Effective presentation and public speaking skills are important in different business areas. Different formats and purposes of presentations range from prepared Power Point presentations, educational sessions to eulogies and short impromptu presentations. Regardless of the type of the presentation, developing the confidence and demonstrating the ability to effectively speak in front of a group of people is a very challenging task which includes both verbal and nonverbal preparation. On the one hand, a presenter needs to prepare and handle his presentation accompanied by questions in a confident manner. On the other hand, he has to create an aura of confidence, enthusiasm and power by using appropriate body language which, as an essential part of emotional intelligence, can help establish a rapport with the audience and reinforce or contradict verbal messages a presenter sends.

5. Pedagogical implications

The authors of the paper realized the imperative need for communicative competency at the workplace since the prosperous employers of electrical and computer engineering graduates emphasized the importance of non-technical communication skills they demand. We believe that higher education institutions should work on designing and implementing a course aiming to develop active listening, speaking, academic writing, teamwork and presentation skills. In addition to a specialized communication skills course, professors should undergo a paradigm shift of mere teaching their engineering course and perform the role of communication and soft skills trainers by assigning pair and team work tasks.
whose results should be disseminated in both written report and presentation form. Consequently, it would develop and/or improve students’ communication skills and lead them to master the art of conversation employers demand.

6. Conclusions

The aim of this research was to study the employers’ opinion and demand of communication skills in their potential employees. For the purpose of the research, a survey composed of 40 closed-ended Likert-type scale questions was created in Google Docs and sent to the employers cooperating with the Faculty of Electrical Engineering, Computer Science and Information Technology Osijek, Croatia. Participation in the survey was optional and anonymous. 61 employers, i.e. half of the total population, participated in the survey. The results were processed with SPSS used for descriptive statistics and Pearson correlation tests. The results showed that 88.5% employers think that developed communication skills are very important or absolutely essential. The employers demand that their employees are active listeners who will pay attention to both verbal and nonverbal messages of a speaker thus engaging themselves in the communication process. The results of speaking skills revealed that there are two groups of employers; on the one hand, there are employers who demand the use of the standard Croatian language not tolerating the use of jargon or slang and on the other, there are employers who request the advanced level of the English language and accept the use of engineering jargon. Both groups of employers would like that employees are relaxed during their clear and concise speeches. Furthermore, the employers are aware of the importance of building healthy and friendly working atmosphere. The workplace should be a platform for accepting and respecting other people’s opinions and sharing relevant information and ideas during round-table constructive rule-obeyed discussions. A substantial share of communication is nowadays done via e-mail, so demanding e-mail etiquette is a natural thing. The correlation results of writing skills are in line with our speaking skills results thus confirming our hypothesis that there are two groups of employers – more conservative employers who demand the highest level of professionalism in structuring written materials as well as exhibiting excellent grammar and style and the employers who are more tolerant to the use of
Anglicism, emoticons and emoji in addition to making grammatical and stylistic mistakes. Finally, the employers demand a detailed preparation and confident work results presentation with a special emphasis on nonverbal communication used to attract and retain the audience’s attention as well as establishing a rapport thus resulting in business success.

6.1. Limitations of the research

There are several weak points of our research. The survey was composed of closed-ended questions which might have a lower validity than open-ended questions, i.e. there might be some issues we did not anticipate thus depriving the participants of addressing some crucial issues. Also, our research results are limited in a way that they do not allow us to make generalizations about employers’ demands since the research was done on a small subset of the employers cooperating and probably employing engineering graduates of our higher education institution. However, we got useful insights that shed some light on the demands the employers put forward to graduates and consequently higher education institutions.

6.2. Recommendations for further research

The present study suggests a new perspective of educating engineering students. A more immediate way to proceed to complement our results is to conduct a follow-up study on a larger scale, i.e. include more participants from multiple engineering companies and find out their demands from potential employees. Researchers could also study engineering graduates’ opinion on what their prospective employers demand as well as opinions of higher education institutions management on the same issue. This will provide a feedback from all participants engaged in tertiary education which is to have an applicable purpose in engineering education, i.e. design or revise current curricula to meet the industry and market needs.
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