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DEVELOPING ORAL AND WRITTEN COMMUNICATION SKILLS

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Undergraduate engineering students have numerous projects and a final thesis which stipulate written, oral and visual reporting. Consequently, they claim they are lacking and wish to develop adequate communication skills. Therefore, certain contents from the course *Communication skills* have been integrated into the existing *English language* course, which concentrates on the specific peculiarities of scientific language and the development of writing and presentation skills. By applying the principles of the Pyramid structure, students actively participate in giving presentations. Novel elements such as self- and peer- evaluation, portfolios, questionnaires and retrospective analysis result in changing their attitude towards speaking and writing, and make the classes more dynamic and interesting, both for the teacher and students.

Keywords: communication skills, retrospective analysis, peer-evaluation, portfolio, presentations, Pyramid principle, self-evaluation

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1. INTRODUCTION

The Electrical Engineering curriculum is designed to prepare undergraduate students to become professionals in the field of electrical engineering. However, unfortunately, written and oral skills have often been neglected, so today there are many engineers with excellent practical knowledge but lacking communication skills. Börstler and Johansson (1998) claim that computer science curricula pay little attention to the development of communication skills. In their opinion such courses are seen as very important to prepare students for their final thesis and professional careers. In the experience of Surratt (2006) the oral and written communication skills of the first-year pharmacy graduate students are suboptimal, students possess mediocre oral presentation skills and perhaps even worse writing skills. Holiday-Goodman et al. (1994) observe that the lack of writing skills is not solely a problem of pharmacy education because other disciplines report similar deficiencies in critical reading and writing skills, and therefore faculties are encouraged to incorporate more writing into their curricula. Surratt (2006) points out that obtaining formal presentation and writing skills could be the most important aspect of graduate student education. When asked which qualities were most important for obtaining employment, graduate business students ranked "communication skills" first, above "graduate qualities"¹ which included "problem solving", "ability to work collaboratively" and "body of knowledge" (Feast, 2001). Cass and Fernandes (2008) attempt to improve students' attitudes towards communication skills, since students in technology-focused fields often have an aversion to learning communication skills. Their students practice research, writing and presenting in the context of simulated technical conferences.

In the year 2005 the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture in Split introduced a novel course in Croatian, entitled *Communication skills* as an obligatory course in the first semester for first year electrical engineering and computing students. This course is oriented towards acquiring professional competence in the field of communication skills. In order to find out the students' attitude

¹ Graduate qualities are described as those skills which are useful in a range of work and life situations (Feast, 2001)

towards this course, amongst students who did not have the opportunity to attend such a course, a questionnaire was conducted with 135 pre-Bologna students in the second semester of the academic year 2008. 68% of the students agreed about the necessity of introducing such a course which would concentrate on speaking and writing skills. Also, teacher experiences have led to conclusions that the course *Communication skills* should raise awareness on the necessity of improving the quality of speech and writing of students of technical studies.

English language is taught as an obligatory course which includes two hours of formal instruction a week over a period of three semesters for electrical engineering students and two hours a week during two semesters for computing students. The syllabus of English includes reading authentic texts from the textbook *English in Electrical Engineering and Computing* (Štambuk, 2002). These involve finding key information in the text, translating, acquiring specific technical terminology and syntactic features of technical English. The acquired contents from the course *Communication skills* have been integrated into the existing *English course*. Besides concentrating on the specific needs of the scientific language, students are expected to develop oral and written communication skills as well. Writing communication skills include the skill of gathering information from reference sources such as encyclopedias, articles in journals and magazines, the Internet and electronic media, interpreting and documenting information followed by writing abstracts. Oral communication skills involve the ability to express ideas clearly, concisely and persuasively. However, psychological aspects are a key issue as well. The speaking anxiety, particularly speaking in front of colleagues and speaking in another language needs to be overcome and self-esteem and confidence are to be built up and achieved gradually.

Students are expected to write formal reports and present them to the rest of the class on a regular basis. The lessons, planned around giving presentations and writing papers, are designed in a way that gives students the chance to actively participate. By actively participating as evaluators and self-evaluators, students are encouraged to become more receptive and co-operative in the classroom, which in turn makes the lessons more spontaneous, creative and enjoyable, both for the teacher and students.

This paper presents the way students prepare their presentations and papers based on the rules of the Pyramid Principle (Figure 1), at the same time actively taking over the role of evaluator and self-evaluator, thereby acquiring needed skills in more informal classroom activities. Student participation in the assessment has been advocated on the grounds of the learning benefits as a result of being involved in giving and receiving feedback (Magin and Helmore, 2001). Magin and Helmore point out that there is a general agreement on the value of feedback from peer assessment in promoting learning. The ability to judge the performance of peers critically and objectively is a skill that students should possess when they enter employment (Kwan and Leung, 1996).

2. Classroom activities

2.1 Applying the pyramid structure

After being taught the basic principles of writing papers and giving presentations, students are expected to write and present in front of their colleagues, acting as the audience and presenters. The student needs to follow the standard structure of a presentation, which includes an introduction, two or three key points, a conclusion and inviting questions. Before the presentation, formally written abstracts are submitted both to the teacher and to an “evaluating committee”, which consists of five students in the class who are going to evaluate their peer’s presentation according to the criteria of a well performed presentation (Questionnaire 1, see Appendix 1), and will judge whether the presentation has covered chronologically the issues stated in the abstract. Abstracts should be done in advance, for homework, giving the evaluators a chance to prepare questions for the coming presentation. In this way every student eventually becomes a presenter and an evaluator.

The next step is writing a review paper. One of the most important goals of our lessons is to teach the students how to give structure to information and ideas, as an important requirement for developing good speaking as well as writing skills. Organizing ideas and giving them a coherent structure while speaking and writing is for many students a difficult task. Based on the facts and ideas gathered from a variety of sources, a research paper has to be written and a presentation has to be

done afterwards, following the rules of the Pyramid principle (Barker, 2006). The pyramid stands for hierarchically designed thinking which precedes the writing. The preparation starts with identifying the central message with a clear objective. This leading message has a number of key ideas, joined into clusters that support the message. The best way to organize ideas is inductively, by grouping and summarizing them, create a shape that allows the reader's and listener's mind to understand complex issues in the most natural way. The process consists of two stages (Barker, 2006). First-stage thinking is gathering information from different sources, whereas second-stage thinking is organizing the information, using the Pyramid principle. The pyramid is usually structured in four levels (Figure 1).

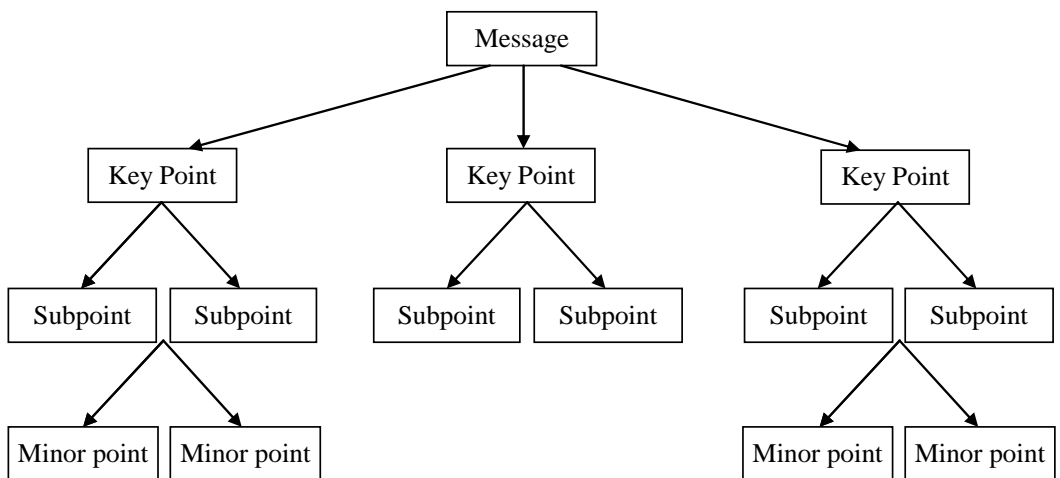


Figure 1. Building a pyramid (Barker, 2006)

The pyramid brings order into chaos by giving thoughts a clear structure. Each idea is a result of a provoked question. Each key point, subpoint and minor point in the pyramid are answers to the questions. This question-answer process results in a pyramid structure (Figure 2). Every idea is a sentence, each idea must summarize the ideas grouped beneath it and each idea within a group is an answer to the question provoked by the summarizing idea (Barker, 2006). Ideas must be ordered in each group in terms of relevance, chronology or logical reasoning. The ideas need to be

relevant and complete, summary points must clearly reflect the structure. By using the model of a pyramid, the ideas are transferred to the written form (a review paper) and to slides in an oral presentation, which become an overview of the whole paper and presentation on a miniature level.

Once the pyramid has been established, students may start with writing. Students are taught to follow the criteria for effective writing, which relate to the standardized format of the document, content and science writing aspects (Gačić, 2001). Special emphasis is paid to grammar. “No one advocates sloppy reports, poor grammar, incorrect punctuation or bad syntax. On the contrary, everyone is held to the highest standards when the purpose of the final written product has the necessity for those standards” (Holiday-Goodman et al., 1994: 258).

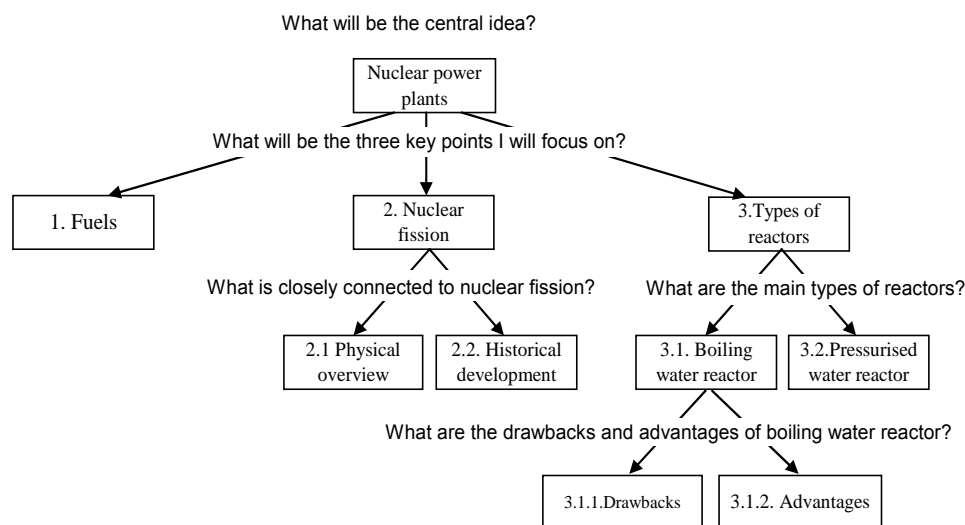


Figure 2. Classroom presentation

2.2 Giving presentations

The students are asked to give a scientific presentation with the primary objective of clearly, concisely, creatively and coherently reviewing the topic. “An effective presentation is a difficult goal to achieve and equally difficult to evaluate due to inherent variables- those of the presenter and those of the audience” (Balistreri, 2002:1).

Presenting in a foreign language with confidence is a difficult and demanding task. The presenter must arrange his/her thoughts and ideas in a logical way, develop an appropriate style in the language, remember and deliver the ideas with words, non-verbal behaviour and visual cues. The quality of the presentation depends on the use of the voice, eyes, gestures, posture and movement, as well. Consistent body language, lively speaking and fluent English largely contribute to satisfactory performance. The presentation lasts for seven minutes and each student has his/her three minutes to address the audience. It is very important to adhere to the mandated time limit because this way, presenters are forced to be concise, to learn how to separate relevant from irrelevant information and to master the skill of presenting. Another important aspect is rehearsing for several reasons. Rehearsing in real time, without skipping bits, helps the students to manage the content, making sure that the message is clearly transmitted and that there are adequate transitions between slides. At the same time rehearsing out loud results in fluency. Under-rehearsed presenters spend too much time working out what to say, struggling with finding words and expressions. Well-rehearsed presenters know what to say and can improvise according to the demands of the moment.

Students are helped with typical key phrases in English covering the structure of the presentation. These are standard phrases for introducing the speaker, the topic, describing the key points, phrases for effective summaries and inviting questions (Paul, 2007).

Students use cards which help them to keep the pace and make the presentation come alive. Cards have a number of key advantages. They remind the presenter in case he/she forgets certain words or ideas. By writing only brief notes, the presenter is forced to think about what he/she is saying, while saying it. Besides mastering the rules of effective vocal and nonverbal communication, students are taught to master the technical level. Special attention is paid to visual aids, keeping the slides looking consistent in font and overall design. Backgrounds must be designed professionally, paying special attention to the use of colours, making the information more interesting and more memorable. The students need to work on these techniques in order to make the presentations interesting, influential and professional.

Bradbury (2006) claims that the average audience will recall about 85% of a mixed verbal/visual presentation after three hours and as much as

66% will be remembered after three days, whereas about 70% will be remembered three hours later when it is a purely verbal presentation and as little as 10% only three days later.

Students have learned about the importance of all these aspects, knowing that information is not only transmitted through words, but also through the voice, the body language and the quality of slides.

3. STUDENTS' AND TEACHER'S ASSESSMENT

While listening to the presentation, five students, together with the teacher, evaluate the presentations according to different criteria in the form of a questionnaire² (Questionnaire 1, see Appendix 1). The students and the teacher have defined these criteria together. By letting the students participate in the identification of the criteria, they get a better understanding of what is expected. Knowing the criteria and being clear about goals makes a positive contribution to the performance (Locke et al., 1981) and the gap between the teacher's and students' evaluations becomes reduced. The students assess the presenter while presenting, and the student evaluates himself/herself afterwards. Peers and teacher, two different sources, provide useful data for comparison, helping the student develop an accurate picture of his/her strengths and weaknesses. Through this opportunity to self-assess, the student's motivation will be enhanced and self-confidence will be established and the attitude towards speaking improved. These aspects are evaluated by peers and aspects of verbal communication (lexical, morphological, syntactic and phonological errors) are evaluated by the teacher (criteria are listed in Questionnaire 2, see Appendix 2).

Additional three minutes are allotted for questions that are posed after the presentation. Questions are extremely important to create positive interaction, to clear up misunderstandings immediately and stimulate discussion. Questions mirror the level of understanding and areas of students' special interests and, on the other hand, students practice asking morpho-syntactically and semantically well-formed questions, which is for many students a challenging task.

² The questionnaire was made respecting the criteria for grading oral presentations (Surratt, 2006).

Before the presentation, students are asked to write down all the drawbacks, fears, practical problems they were facing while preparing for writing and speaking. Teachers are provided with useful information they would otherwise lack. A retrospective analysis is achieved, which can be a powerful tool for the teachers, since this analysis can be considered as an input for more effective teaching.

The psychological aspect of self-evaluation is to give the student a chance to evaluate himself/herself, as well as others, which lessens the speaking anxiety and boosts self-confidence. Furthermore, it breaks down the barrier between the teacher and the students. The most frequently raised questions throughout the process from gathering information to writing are collected from the students, serving as a guideline for the teacher (List 1).

List 1: The most frequently occurring questions

1. *What will I choose as the central idea?*
2. *How will I organize information in the pyramid and connect information?*
3. *Is there sufficient information to support the main points?*
4. *Is my presentation going to be boring?*
5. *I am not confident when I have to speak in English. How will I avoid grammatical mistakes?*
6. *Once I have the sources, how will I distinguish the degree of relevance?*

Presenters are encouraged to evaluate their performance in the context of the criteria found in Questionnaire 1. The teacher gives feedback after the class, comparing the views. The students show interest in their performance and tend to come after the lessons or receive on-line advice, discussing their performance with the teacher. Each student possesses a portfolio entitled *My gradual improvement and final success*, a folder containing stored questionnaires, serving as a personal record of gradual improvement. It gives an insight into the individual situation of each student and students prefer this non-conventional informal evaluation where weaknesses gradually become a challenge.

4. EVALUATION OF ABSTRACTS

To assess the formally written abstracts, the teacher uses the criteria presented in Questionnaire 3 (see Appendix 3). The most frequently observed weaknesses in writing are lack of cohesion, the use of unclear utterances, unnecessary information, surplus of words, unconnected information, insufficient number of words and insufficiently informative abstracts. The students often confuse the abstracts with introductions and satisfactory conclusions. The summaries are usually not coherent and concise, they do not follow the chronology of the article, many times provide no logical connections between sentences and students oftentimes use the first and second person which is not typical for technical writing. Students also put results expressed in figures into the abstracts and the overall general tone is often not technical and scientific, having too many elements of spoken language. Surratt (2006) found that that the writing problems include incomplete sentences and improper punctuation, word choice and verb conjugation. The prose is often found to be of a stream-of-consciousness style and without organization.

All these observed strengths and weaknesses can be considered as inputs for more effective teaching, concentrating on specific areas that need further attention.

5. CONCLUSION

The Electrical Engineering curriculum is designed to prepare the undergraduate students to become experts in the field of electrical engineering but the written and oral skills have often been neglected and today there are many engineers who are experts in the field of their specialism but are lacking in communication skills. These skills need to be developed since their thesis and projects require written, oral and visual reporting. Besides concentrating on the specific needs of the scientific language, the English classes have been enriched by integrating acquired contents from the course Communication skills. Students actively participate in giving presentations, writing review papers and abstracts, applying the principles of the Pyramid structure. Novel elements such as self-evaluation, peer-evaluation, original questionnaires, portfolios entitled *My gradual improvement and final success* change the attitude towards speaking and increase the motivation for learning over the course. Novice

speakers gradually build up self-esteem and become confident and capable presenters. The retrospective analysis provided by the students serves as a powerful tool for the teacher and contributes to more successful teaching. The questionnaire which was conducted among our students shows that students agree about the necessity of integrating communication skills development into existing courses, which need to be reinforced throughout the curriculum to prepare them for their professional careers.

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RAZVOJ USMENIH I PISANIH KOMUNIKACIJSKIH VJEŠTINA

Studenti preddiplomskih studija na programima inženjerstva tvrde da im nedostaju adekvatne komunikacijske vještine koje se moraju razvijati, budući da mnogi projekti i njihovi završni radovi zahtijevaju pisano, govorno i vizualno priopćenje. Stoga se usvojeni sadržaji iz kolegija *Komunikacijske vještine* integriraju u postojeći kolegij *Engleski jezik*, koji se fokusira na specifične potrebe stručnoga jezika i razvijanje vještina pisanja i prezentiranja. Primjenjujući načela strukture piramide, studenti aktivno sudjeluju u prezentacijama. Novi elementi poput samoevaluacije, uzajamnoga ocjenjivanja studenata, portfoliji, upitnici i retrospektivne analize mijenjaju stav učenika prema govorenju i pisanju te na taj način nastavu čine dinamičnijom i zanimljivijom, kako za nastavnika, tako i za studente.

Ključne riječi: komunikacijske vještine, retrospektivna analiza, uzajamno ocjenjivanje studenata, portfolio, prezentacije, struktura piramide, samoevaluacija

Appendix 1. Questionnaire 1: Students' criteria for evaluation

<u>1. Verbal and vocal delivery</u>		
1. Did the presenter use many fillers (mostly "er") and repetitions?	Yes	No
2. Was the presenter well-prepared?	Yes	No
4. Was the presenter precise (clear objective and message)?	Yes	No
5. Did the presenter use rhetorical questions?	Yes	No
6. Did the presenter follow the KISS principle?(Keep it short and simple)	Yes	No
7. Was the pronunciation satisfactory?	Yes	No
8. Was the presenter:		
a) too fast	Yes	No
b) too slow	Yes	No
c) monotonous	Yes	No
9. Did the presenter change intonation?	Yes	No
10. Did the presenter have a pleasant performance?	Yes	No
<u>2. Non-verbal communication</u>		
1. Did the presenter follow the rules of effective non verbal communication (body posture, effective eye contact)?	Yes	No
<u>3. Quality of slides</u>		
1. Were the visual aids designed effectively (pie charts, graphs, histograms.)?	Yes	No
2. Were the figures and tables of appropriate size, sharpness and colour, were they properly annotated?	Yes	No
3. Was the used font readable to the audience?	Yes	No
4. Was too much information presented on the slides?	Yes	No
5. Did the presenter use the key-points?	Yes	No
6. Did the presentation follow the chronology of the abstract?	Yes	No
<u>4. Questions</u>		
1. Could the speaker answer simple clarification questions that would indicate that she/he had thoroughly read the article?	Yes	No
<u>5. Organization</u>		
1. Was the presenter well-prepared?	Yes	No
3. Did the speaker digress during explanations?	Yes	No
4. Did the topic closely relate to the field of electrical engineering?	Yes	No
5. Did the presenter provide sufficient information on the topic?	Yes	No
6. Did the presentation contain all necessary elements, constructed in a logical sequence (key points, minor points, sub points, effective introduction, main body, closing and inviting questions)?	Yes	No

Appendix 2. Questionnaire 2: Teacher's criteria for evaluating presentations

<p><u>Morpho-syntactic and semantic errors</u></p> <ol style="list-style-type: none"> 1. Were the sentences morpho-syntactically and semantically well-formed? 2. Was the pronunciation satisfactory? 	<p>Remarks</p>
<ol style="list-style-type: none"> 3. What were the most frequently observed errors? 4. What are the areas that should be improved? 	<p>Remarks</p>

Appendix 3. Questionnaire 3: Teacher's criteria for evaluating abstracts

<p><u>Format</u></p> <ol style="list-style-type: none"> 1. Did the abstract provide a brief (max. 100-200 words) outline of what the presentation was about? 2. Was the submitted Word file professional in appearance? <p><u>Grammar</u></p> <ol style="list-style-type: none"> 1. Were the words spelled correctly? Were informal words and phrases avoided? 2. Was the punctuation correct? Were clauses appropriately joined with commas and hyphens? 3. Were there grammatical mistakes present (wrong verbal tenses, omitted articles, wrong use of prepositions, relative pronouns, syntactically awkward structures)? <p><u>Content</u></p> <ol style="list-style-type: none"> 1. Did it follow the chronology of the presentation and the paper? 2. Did the abstract begin with a one-sentence summary of the main point of the presentation and did it introduce the problem being discussed? 3. Were all keynotes present in the abstract? 4. Were the ideas organized in a logical fashion? <p><u>Science writing aspects</u></p> <ol style="list-style-type: none"> 1. Was the passive voice used? 2. Was the scientific vocabulary used and not the general vocabulary? <p>Remarks:</p>
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