

„BABES-BOLYAI” UNIVERSITY OF CLUJ-NAPOCA
Faculty of Psychology and Science of Education
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ABSTRACT OF DOCTORAL THESIS

**EVALUATION OF COMMUNICATIONAL COMPETENCES AT
ENGLISH**

General competences and specific competences of technical students

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Relevance of the chosen topic

University education has become a subject of many deep transformations due to its dependency on the broad social context.

Worldwide, as soon as the iron curtains had disappeared and the restraining walls of former oppressive regimes had collapsed, scientific discoveries and technological progress took over. The new science areas and the new technologies do not belong to a single people any more and they are not subjected to one single political power. Science and technology have freed themselves from the burden of ideology and they now belong to humanity. It has been concluded that the problems of one country, even the problems of one continent, are not just problems of one area of the globe, rather they represent problems for the entire world. Pollution, technologies affecting the health of the Earth, all these can be annihilated only with the help of all the inhabitants of this world. Anybody receiving a formal education can no longer rely on storing information in their brains, rather they must acquire those instruments that will allow them to apply the information in new contexts, to adapt and improve that information by connecting it to other areas and other fields and to collaborate with other people that have information from those areas of expertise. Education must now enforce competences and not settle for the passing of information. This is vital for the higher forms of education, such as the universities, which are meant to provide the society with the specialists that will be able to create a vision about the future and build a new society based on that vision.

Creating a system of education at the university level that is based on the development of competences requires a few changes. First of all, the students enlisting this system of education should be already trained in the development of competences from the early stages of formal education. Secondly, the entire system of education at the university level should be re-formed and aimed at the development of competences. This implies the change in the teaching methodology, re-writing and re-organizing the teaching materials and the creation of new tests and assessment criteria. Thirdly, both the students and the teaching staff should assume the new roles demanded by this new approach towards the development of competences.

Previously, the high education graduate belonged to a social elite, received a special status ensured by the diploma.

These days, university education no longer ensures a place in the high society, but it can be the solution for a better life and can ensure a better workplace. Thus, although legally optional, university education has become compulsory thanks to the societal pressure.

University education has become education for the masses based on the high number of students enlisting each year. This form of massification is the result of external pressure exerted on the university but it is also the result of the technological development of our society. Many of the jobs available two decades ago have been replaced by modern technological systems. The worker has been replaced by the machine. There is a higher demand for specialists that are trained to operate these machines rather than work in their stead.

The role of the university is no longer only that of creating the elite of the society (through their master and doctoral programs) but it has to provide education for a better labour insertion. It still has authority in the field of the creation of the elites, but when it comes to educating the people for a profession, the university has to meet the demands of the working community that will hire its graduates.

The new curricula do not rely merely on passing knowledge and information towards the students, they have to offer programs that will develop competences (Chis, V., 2005, 2006, 2009).

People's competences are measured by their ability to learn as they go, to cultivate their vision on the future, to constantly evaluate their abilities and skills and to adapt their approaches to the new criteria. Contemporary people must learn to constantly adapt to a permanently changing society and to a community that is in constant movement. They must acquire information that will allow them to get to a certain social and professional status and will allow them to be able to change in order to evolve and develop.

People need learning experiences that will enable them to develop discernment, professional ethics, respect for nature and for the past and future generations, a desire to discover and the desire to belong to a global community, willingness to define their own individuality in this global community, an ability and a desire to self improvement in accordance to the development of the global society.

Now more than ever science and technology do not belong to a single ethnic or national community. The scientific discoveries and the technological progress are everywhere, saving lives and improving the quality of life. Science and technology no longer communicate solely through their specific universal language – Mathematics – like they did in the past, as science and technology no longer belong to the intellectual elite of humanity. Science and technology have become an integrated part of our daily lives.

In the outpost of these scientific discoveries and technological progress we find the engineers, those contemporary people who, now more than ever, dedicated their professional lives to making this world a bit cleaner, less polluted, with technologies that treat and improve nature, the human body, the environment. Communicating these new discoveries to the world is done by the same means that gives birth to literature and that creates cultural bridges between nations and continents.

In this new communicational environment, the engineers do not communicate solely with their counterparts or peers using the specific language of science and technology, rather they must communicate with the entire community, since the entire community is the beneficiary of their work. This new context force the engineers to become not only very good professionals, but also very good communicators (Weichert, A., 2001).

In Europe, the European Conference held in Bergen on May 2005, adopts the European Qualification Framework for the higher education. The document contains descriptors for the qualifications gained after the graduation of each level of higher education – bachelor, master and PhD. The national bodies have begun to create national frameworks based on this European framework. This process will be ended in 2010.

This document outlines the *four major goals of higher education*:

1. preparation for the labour market;

2. preparation for life as active citizens in a democratic society
3. personal development
4. the development and maintenance of a broad, advanced knowledge base
(http://www.bologna-bergen2005.no/Docs/00-Main_doc/050218_QF_EHEA.pdf)

Thus, this dialogue between the university and the community at large demands certain changes in the way in which the university is organized. The representatives of the economy demand future employees with certain skills and competences which sometimes might have been ignored by the university curricula. Many universities are yet to become fit to provide this kind of education for the students and this is a fact not only in Romania.

The third chapter of this thesis presents a suite of four case studies that show that most of the universities and their communities that belong to the European space converge towards balancing between the higher education training and the demands of the professional environment that will hire them after graduation. Two of these case studies present statistical data and qualitative analyses from Spain and the United Kingdom, while the next two focus on the way this process takes place in Romania in general and in the case of the Technical University of Cluj Napoca.

Research trends and theoretical background regarding the development and assessment of communicational competences at English

The first two chapters of the thesis present a part of the theoretical backgrounds regarding the communicational competences.

In his book entitled *Noul curriculum – curriculum pentru competente* (*The new curriculum – the curriculum for competences*) (2006), Prof. Vasile Chis provides an overall of three definitions for the term **competence**:

Definition 1: Competence is the ability to accomplish various activities related to an occupation or function at a standard defined by the employer.

Definition 2: Competence is owning and developing knowledge and abilities, proper attitudes and experiences that are necessary for the accomplishment of assumed roles.

Definition 3: The competences are complex structures with operational value that are placed among knowledge, attitudes and abilities and have the following characteristics:

- *they ensure the accomplishment of assumed roles and responsibilities,*
- *correlate roles and responsibilities with performance*
- *can be measured on a standardised scale for performance*
- *can be developed through learning (p.18)*

As Prof. Chis states, these definitions describe the competence as being a practical action placed in the professional environment and which is the outcome of learning. This mentioning is vital for the educational process, since it changes the pedagogical paradigm from one that is based on knowledge storage into one that aims at the development of competences.

Prof. Ionescu, in his work entitled *Instructie si educatie* (*Instruction and Education*) (2007, p.105), defines the competences as being *integrated systems of capacities and abilities to apply, operate and transfer acquisitions, which allow the proper manifestation of an activity, the use of knowledge, skills and abilities in a functional manner in various formal, informal and non-formal contexts*. The same paper states that *to master a competence does not only mean that you know how to make or do something or to possess a certain technique, but rather it implies the ability to attach a particular situation to a family of situations and to approach it in a proper manner (...)*

Thus, the competence is an integration of knowledge, application and transfer instruments of the knowledge into new contexts, but also the ability to approach a specific situation in a proper manner, in other words, the ability to have the proper attitude in order to do something.

The European Qualification Framework for Lifelong Learning – EQF, presents a document on 23 April 2008 in which it defines a framework for eight main qualification levels. The Annex of this document provides definitions for all the terms found in the framework. Here competence is defined as being *the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development.*

(http://ec.europa.eu/education/policies/educ/eqf/eqf08_en.pdf).

This definition provides a very important characteristic of competence. This is being defined as a proven ability. In other words, competence should be an element that we can quantify, that we can identify on a scale or evaluation grid, that can be measured and compared to predefined criteria and norms for a specific area in which this competence is manifest.

Synthesizing all the common elements of these definitions, we declare that *a competence is an integrated and quantifiable system of acquired knowledge, abilities and attitudes that facilitate the accomplishment of a professional or personal development task.*

In other words, competence is the manifestation of what an individual can do at a certain moment in time, given a certain context, and that this proof is quantifiable and measurable against a universal standard that is valid for that particular learnt activity that has been performed at a similar moment in time like the one we measure and in similar circumstances like the one manifested at the moment of the evaluation.

Using the definition we suggested for the competence in general, we can state that communicational competence is *an integrated and quantifiable system of acquired knowledge, abilities and attitudes that facilitate the accomplishment of a communicational professional or personal development task.*

The fundamental stage in the development of communicational competences is the language acquisition.

Given the magnitude of this stage in the development of the human being, time has witnessed several theories regarding the language acquisition and the way in which the child ends up communicating to the environment using correct and coherent structures. Although each theory manages to explain a small part of this process, language acquisition still remains a reality cloaked in mystery. For this thesis we chose to discuss two of such theories, namely the Noah Chomsky (1981) theory and the interactionist theory, mainly because we agree with these two.

However, language acquisition is necessary but not sufficient for the development of communicational competences. Language supports verbal communication by means of the linguistic structure (the word). Paralanguage is represented by all communicational components that complete the verbal communication by improving the quality of the communication, but the constant connection to the environment takes place thanks to the non-verbal communication such as eye contact, facial expressions, body language, even clothing or pieces of furniture (Pânisoara, I.O., 2007).

A very important communicational element is the meta-communication, that is the birth of certain implications of the message that cannot be attributed to the meaning of the words themselves nor to the way they have been uttered (op.cit.). All these elements belong to the knowledge about language and communication and they have to represent the basis for the development of communicational competences as fundamental cornerstones. A poor wording leads to burden the communication, just like a lack in the proper usage of paralanguage and non-verbal communication could lead to the death of the communication, while as ignoring the mechanisms of meta-communication could put the individual into embarrassing situations both for themselves and for their communicational partners.

In addition to this, all these parts of communication function in specific media, which the individual will have to master by developing skills that they will use as instruments of coding and decoding messages. Thus, verbal and para-verbal

communication rely on skills like reading and writing, listening and speaking. Their accuracy will be responsible for the success of the communication.

In what communicating in a foreign language is concerned, teaching and learning a foreign language is not similar to teaching and learning other scholastic subjects. As Klein states (1986), language acquisition is vital for the communication in the first language but it is also vital for the subsequent learning of other languages. Acquiring the first language, or the mother tongue (as it is called by certain authors), takes place at the moment when the child had no other language acquired for the purpose of communicating to the environment.

Once the first language is acquired, the child also gains the cognitive categories that are at the foundation of expressive means for the natural languages, such as the categories for time, space, modality, causality, etc. These cognitive categories are automatically gained once the first language is acquired and their integration in the social and communicative context represent a vital aspect of learning second or foreign languages. (op.cit)

From the cognitive perspective, Klein (op.cit) claims that when learning a new language, those crucial elements only have to be modified and adjusted according to the new communicational dimensions.

Although many voices still claim and discuss about learning a language „from scratch”, this practically never happens. If in the case of other subjects or sciences we can talk about developing the notions during the teaching process, in the case of teaching another language these notions have already been formed once the first language has been acquired. Thus, we speak of transferring the notions and widening their area of influence.

The concept of communicational competence was introduced in applied linguistics as a reaction to the theories concerning language competence which focused exclusively on grammar. According to this theory that focuses on communication, the communicational competence emphasizes on those who use the language to communicate. (Luoma, S., 2004). Thanks to this method that supports the development of communicational competences in the language classrooms has led, among other aspects, to the usage of authentic materials and communicational exercises.

The new methodologies start from the idea that the primordial function of a language is communication. Thus the communicational approach is born, which claims that we do not communicate by forming sentences, but rather by using sentences to express various claims, descriptions, recordings, classifications, demands, requests (Widdowson, H.G., 1972).

This paradigm is completed by another one that assesses the teaching process that aims at the development of communicational competences. Thus, a pedagogy of competences will find a faithful partner in a docimological system based on assessment of competences.

Since assessment is part of this process that aims to develop communicational competences, the tasks and the learners' performance have to be strongly connected to the real life contexts and tasks are created based on both closed and open questions, reaching all the levels of Bloom's taxonomy. Thus, the tasks check if the learners have a deep understanding of what they have learnt and if they are capable of transferring what they have learnt into new contexts and situations.

Characteristics of competence assessment (Comoglio M., 2003):

1. It is managed by both student and teacher;
2. Evaluation criteria are public, arranged in scales and offered to the student before taking the test;
3. Determines if the student can explain, apply and justify the answers provided.
4. It verifies if the students have a deep understanding of what they have learnt, thus being able to apply that in new situations;
5. Emphasizes the progress and the development;
6. It is predictive for the manner in which the students will apply what they have learnt in real life situations;
7. Can be applied to similar or analogous situations;
8. It refers to complex tasks that require the integration of several abilities and items of knowledge;
9. It is a deliberate judgement on answers to open questions;

10. The task is created not only to check present performance, but to improve future performances;
11. The students are informed of the result and of the progress made;
12. The results are compared against criteria and those are based on assessment scales expressed in codes or generic names.

As a curricular teaching subject, English depends on a formal instructional context that demands a certain norm of the educational process, generates assessment criteria, standards and norms that are used not only to assess the effort of the learner, but also the effort of the teacher, thus becoming a mirror of the efficiency of the educational process itself.

A certain test answers in a certain way to the question „Why do we assess?“ Authors mention a series of aims for assessment. These aims generate tests and tasks that measure certain abilities or skills. From this perspective, assessing English as a curricular subject is no different than assessing other subject taught in an educational institution.

Subchapter II.3. (*The assessment of the English language as a curricular subject – ways of testing, types of tests and assessment benchmarks*) presents a synthesis of the main ways of testing, some of the types of tests that are usually administered in class and describes some of the assessment scales and grids used in connection to those tests.

We chose to carry out a full analysis of the Common European Framework for Languages and its descriptors as an evaluative instrument since we used this assessment grid as part of the experimental design.

Developing and assessing communicational competences in the English language in the case of technical students – experimental results

Pre-testing

Pre-testing stage was designed so that it could pave the way for the experiment to take place but also to become a complementary part of the experimental stage, thanks to the quantitative and qualitative analyses performed on the data obtained during this pre-testing stage.

Therefore, the pre-testing stage was created based on the following objectives:

O1: establishing objectives and working hypotheses for the experimental stage

Thus, the results of the research performed during the pre-testing stage were designed so that they could offer us valuable data for the creation of the experimental stage and all its components, especially the objectives, working hypotheses, research instruments and independent variables.

O2: identifying the communicational events that take place in English and that are present in the professional industrial and commercial environment in which engineers work

The main purpose of this thesis was to identify instruments which could create teaching and assessing approaches that could assist students enlisted with the Technical University of Cluj Napoca into developing communicational competences that are specific for the engineers working for various industrial and commercial companies, thus facilitating them a smoother insertion into the professional life after graduation.

Therefore, we decided it was of utmost necessity that one of the stages of the pre-testing should focus on the professional industrial and commercial environment and identify those communicational events that are specific to this environment.

The method we used for this objective was the sociologic type of **survey**, namely the written questionnaire.

We created a questionnaire based on 10 closed and semi-closed questions. Apart from the identification elements, the questions were aimed at finding several aspects in connection to the communication in English at the workplace:

- The importance of the English language in the professional activity (scale from 1 to 5);
- Reading English documents (specify which);
- Writing in English (specify);
- Oral interaction in English (listening and speaking).

We were also interesting in finding out whether the engineers had to do translation work.

The answers to this questionnaire were analysed from a quantitative perspective in order to identify those communicational events that were most frequent found in the professional activity of the engineers. However, we have also applied a qualitative instrument of document analysis in order to identify the main features of the documents mentioned as being most frequently read or written at the workplace and the implications involved if such documents were to be part of the syllabus of technical students.

For the questionnaire we searched local Romanian companies or branches of medium or small multinational companies. We took size into consideration because the great multinational companies that are found in the area, such as Nokia or Emerson, are looking for English speaking employees when recruiting them, English being the official communication language in the case of these companies.

Sampling was created using the simple random sampling procedure (Ionescu, 1979, Bocos, 2003), by extracting a number of 70 companies from the Cluj Napoca phone book (Yellow Pages).

Out of these 70 companies, 41 of them responded to our request. From the remaining 29 companies 3 of them replied that they do have engineers employed but they do not use English because, although the companies work with foreign partners, their employees use French (1 company) or German (2 companies); 10 companies did not have a valid email address (the message returned because the address was no longer in use), while 16 companies did not respond at all.

O3: highlighting the curricular areas that aim at the development of communicational competences in English and which are useful in the future profession

As the official documents of the Technical University of Cluj Napoca show (TUCN Report, The Students' Guide), the bachelor level training aims at developing the competences and skills that will allow the graduates to meet the demands of the professional labour environment.

This means that there should be a correlation between the curricular contents found in the syllabus and the answers provided by the engineers to the questionnaire.

In addition, this syllabus should contain not just teaching activities focused on the development and assessment of linguistic competences in English, but also on the development and assessment of communicational competences in this language.

In the case of this objective the **method** used was the **qualitative analysis of the syllabus**.

O4: identifying the didactic strategies that will develop and assess communicational competences in English that are adapted to the specific needs of the higher technical education

The premise that triggered this objective was that the syllabus presents the details of a didactic process in which teaching and assessing English is mainly focused on teaching and assessing language skills and leads in too few instances to the development of competences that can be transferred into new contexts. This may be the fault of the fact that the didactic tests aim mainly at measuring quantitative linguistic components and they do not seek to qualitatively evaluate the papers.

Thus, this objective aims to identify the didactic strategies that will develop and assess communicational competences in English, and this means that the students' papers must not only prove that they possess the proper linguistic instruments that enable them to express themselves correctly, but also prove that they adopted the proper attitude required by the communicational situation.

In this respect, the **method** we chose was the administration of **four docimological tasks** („The professional life of the engineer”, „The Geometry Lesson”, „The Aston Martin DB9”, „Instructions for granny”), which we created especially for this research. Their results were analysed using two different criteria. Thus, the students’ papers were assessed using an instrument that is specific for language tasks evaluation (The Common European Framework for Languages – CEFL) and using a sociologic instrument – document analysis.

O5: creating parallel and equivalent sample groups for the experiment

The experiment we designed required that we create two sample groups of students that will manifest similar characteristics in what communicational competences in English are concerned before introducing the independent variables.

Choosing the sample groups of students took place relatively at random, given the fact that the students included in the experimental group belong to the administrative groups of students that are in the teaching norm of the researcher, while the students from the control group belong to the same faculty and speciality but they have been assigned to the researcher’s colleague teaching norm.

Basically, we have two pre-existing groups of second year students from the Faculty of Mechanics of the Technical University of Cluj Napoca. The volume of each group is 50 students and their membership is mutually exclusive.

The equivalence of the two groups was tested not just based on their demographic characteristics, but also when they have been administered the docimologic tasks. Two of these tasks were administered after the two groups have been separated into experimental group and control group.

Thus, two of the tasks used as an instrument to serve objective 4 (O4) were created to serve two purposes („The Aston Martin DB9” and „Instructions for granny”). They do serve the previous objective but, at the same time, they offered us statistical data that ensured that the two groups are equivalent in what the communicational competences in English are concerned.

The **method** used in this case was the **statistical analysis (the significance test ?2)** of the data and the data showed that the groups were equivalent, the value of ?2 being less than the values specified by the significance benchmark values.

Apart from establishing the equivalence of the two groups, the pre-testing stage generated much valuable information that contributed to the creation of the experiment.

First of all, the responses of the engineers to the questionnaire showed that the industrial and commercial environment of Cluj Napoca presents the characteristics of a professional environment that tends to integrate itself in the global professional environment in which English communicational competences are much valued and could become a cutting out criteria when applying for a job.

A high percentage of domestic companies does not automatically imply that English is not used. On the contrary, the results of the survey show that, although 80% of the engineers that responded to the survey declared that they work for “Romanian” companies, 93% of all respondents declared that the English language and implicitly communicating in this language is a “very important” or “important” aspect of their professional life. Partnerships with domestic and especially foreign companies generate specific documents that are written and read in English, whether we talk about technical documentations, user manuals or business correspondence adjacent to the productive process. Moreover, a high number of engineers have superiors that come from other countries, even if the company is declared “domestic”. It is possible that such a company is built on a foreign management and that is why they would require their employees to abide by a code of conduct much similar to that of a multinational company without damaging the “domestic” and independent character of the company.

We can assume that in the future this situation will not lessen but it will grow even more. We now witness a process of “borrowing” management practices and policies from other companies and this leads to a globalisation of the managerial strategies of many companies. The same globalisation process is found at the marketing level, since the products or services no longer belong to a consumer society that consists of only one ethnic group or that has the same cultural profile. The same phenomena is also present at the level of working relationships, where we find a foreign manager,

Romanian engineers and a crew that is less and less Romanian, thus leading to shifts in what the communicational language between all these levels is concerned. Therefore, even if the company is declared Romanian, it adopts English as a communicational means in order to meet the communicational demands of this globalized environment. As the statistical data show, communication in English to superiors or other colleagues from other departments is already present, while communication with the crew, although a little scarce, is to be found in four cases.

Communication in English presents the following values (fig.1 and 2):

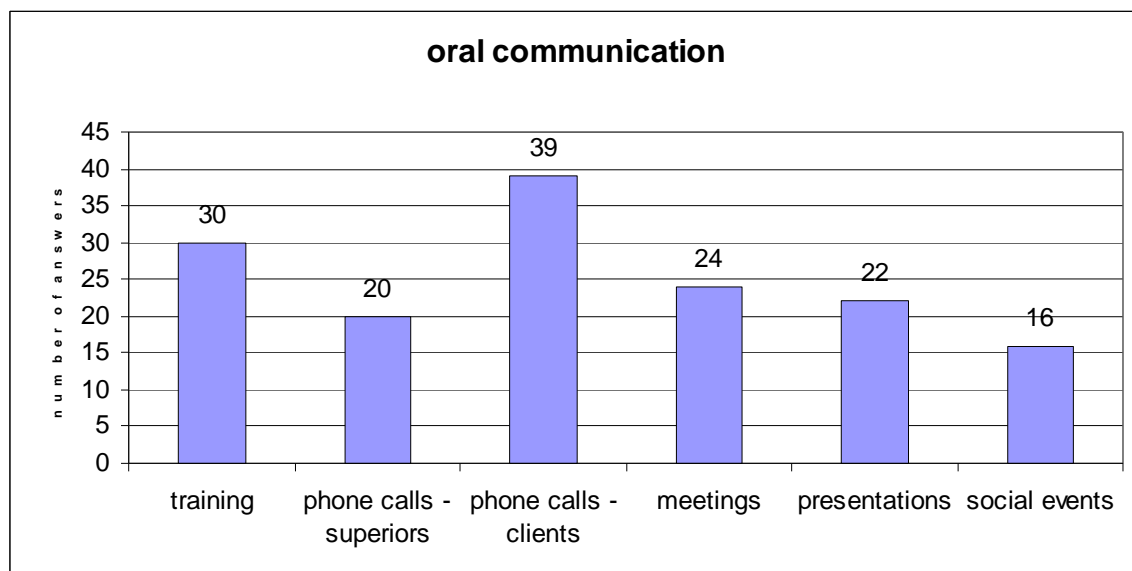
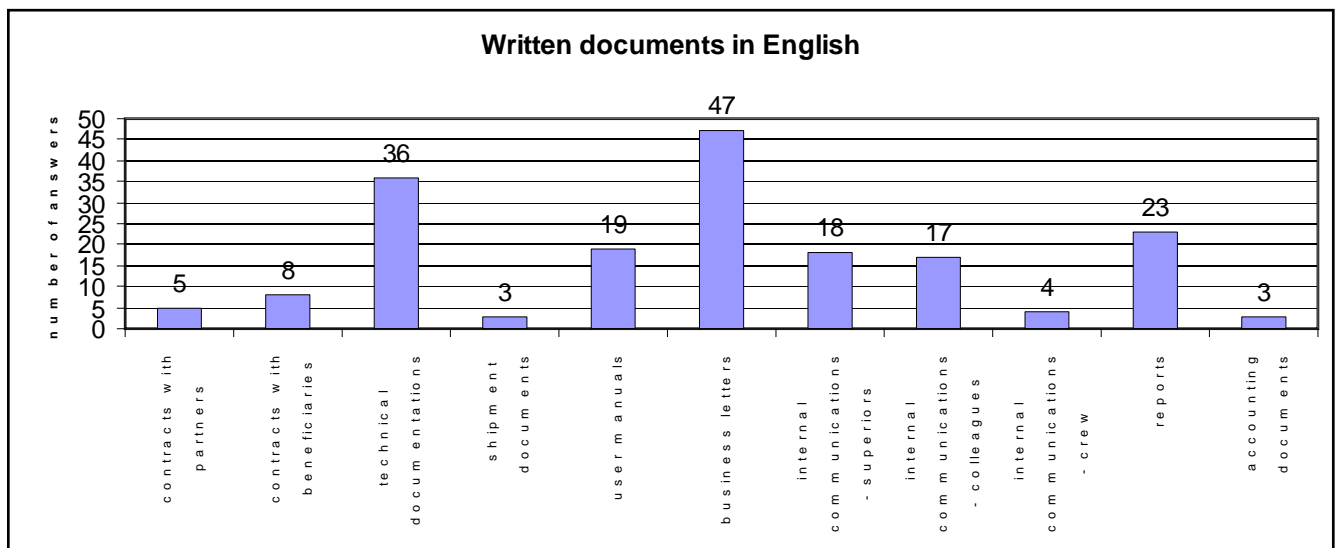


Fig. 1 and 2 – types of written documents and oral communications that are used by the engineers at their workplace

Attempting to harmonize the university training at English with the specific communicational events that are found in the professional life of the engineer, we analysed the syllabus for English language discipline and we found that there are some common elements between the two areas, especially in the case of reading and writing, although the university training focuses on other documents as well, such as the scientific article, the review and the essays. The best represented documents are the instructions. The technical documentations are found in the form of parts in certain activities and objectives of the syllabus especially at the level where the students are asked to describe the characteristics of a machine or device. The least represented are the business letters, which are practices only in the form of the cover letter when applying for a job. Describing a technological process lacks completely from the syllabus.

A positive aspect of the syllabus is given by the translation activities that are part of the individual study plan. As shown by the survey results, translations are part of the professional life of the engineers, and this is proven by a number of 21 positive answers given to that question.

Thus, we found a need to balance the contents taught in university at English with the demands of the professional environment.

The experiment shows one possible way to satisfy this need.

The experiment

As stated previously, pre-testing researches and their results show that there are certain discrepancies between the demands of the professional life and the university training in what the English communicational competences are concerned.

First of all, the results of the docimological tests show that we cannot speak of developing communicational competences during the university training at English. This could be because the contents we teach deal too little and too distantly with those written documents and oral communication events that are found in the professional environment.

Such discrepancies could be eliminated if we change the content of what is being taught to the students but most of all by changing the docimologic tests we administer.

Thus, the purpose of the experiment was to determine those epistemologic and paxiologic benchmarks that would enable us to assess communicational competences in English in the case of technical students.

The first stage of the experiment established the experimental design: determining objectives, stating the general hypothesis and the working hypotheses, choosing methods and creating the research instruments and the independent variables.

The second stage was represented by the experiment itself. During this stage the experimental group of students was exposed to the independent variables. This took place by involving the students in learning activities that operated with newly created teaching materials and using a methodological strategy that aimed at the development of communicational competences in English specific for the professional environment of the engineers.

The third stage was represented by the administration of several docimological tasks after the second stage of the experiment had ended. The purpose was to highlight the nature and the essence of the changes that took place during the experiment in terms of the development of communicational competences in English.

During the fourth stage, the results of the students enlisted in the experimental group were analysed using several methods that would validate or invalidate the general hypothesis and the working hypotheses.

The final stage of the experiment was the re-testing. This checked the durability of the effects of the experiment on the experimental group, especially because the purpose was to create competences that are supposed to become consolidated with the passage of time, the students being able to access them even after years since they graduated.

The experiment was based on the following objectives:

O1: creating a didactic and methodologic context that will ease the development of communicational competences in English that are specific to the professional environment of engineers

This objective has been introduced because, to be able to administer tests that measure communicational competences in English, we must first develop such communicational competences through specific lessons.

In the case of the English courses and seminar taught to technical students, the data obtained by means of the survey shows very clearly which documents and oral communications require the use of English from the part of the engineers at their workplace.

We believe it was necessary for the educational process designed for the technical student to transform these documents and oral communications into specific teaching structures, with contents that would operate with those documents and with methods that facilitated the development of communicational competences that are specific for engineers and their professions.

O2: creating a docimological context that will ease the assessment of communicational competences in English that are specific to the professional environment of engineers

It was vital that the process of creating docimologic tests that would assess communicational competences in English that are specific for the future profession to be accompanied by a process that would elaborate or adopt an assessment grid suitable to measure not just the linguistic skills which we usually measure by means of language tests.

It is most clear that the linguistic aspects of the language are still an essential part of the assessment, since a poor vocabulary or bad grammar contribute significantly to the corruption of the message. But, unlike language tests which measure linguistic competences at best, we created tests that measure communicational competences and therefore they took into account not just linguistic aspects of the communication, but also the attitudinal aspect of communication, the one responsible for the paraverbal and the non-verbal side of communication.

Thus, the tasks that have been created measure communicational competences and benefit from the creation of an assessment grid that is appropriate for such an approach.

The general hypothesis of the experiment was formulated as follows:

Operating with specific communication events that are found in the professional environment of the engineer and administering tests and tasks that require the students to elaborate such documents or oral communications leads to the development of communicational competences in English and to better results to some of the language tests.

This general hypothesis was split into **two working hypotheses**:

Hs1: Using authentic documents and oral communications for the purpose they have been created during the English teaching and assessment processes leads to better results at tests than the results obtained based on applying traditional methods of operating with authentic documents and oral communications during English seminars for technical students

This first working hypothesis was born due to the fact that the tasks we created asked the students to write documents similar to those present in the engineers' professional activity. As the pre-testing stage shows, these documents are related to the communication to specialists (peers) – as it is the case of the technical documentation and the user manual – or are related to the communication to the commercial environment in which the company operates – as it is the case with the business letters, reports and phone conversations.

Aside the fact that from a linguistic point of view these two communicational areas require the student to operate with extremely various lexical and grammatical structures, thus contributing to a very good training of the language, from our perspective they present yet another vital aspect for our research: all these types of tasks produce real-life documents and therefore authentic.

This authenticity trait was vital for this research, because we believe that we cannot assess communicational competences in the absence of the element of authenticity of the communication, and without this element we would be unable to assess the attitudinal component and thus we would be unable to speak about competences at all or holistic or qualitative assessment.

Moreover, we believe that using authentic documents that belong to the professional life of the engineers should be done as it is done in that professional

environment, that is the documents should be used for the purpose they have been created and not as a mere basis for teaching language structures.

This change in the paradigm should have generated better results at language tests, not just from this perspective of the communicational competences – that is proper English usage and proper attitude – but also from the perspective of the linguistic competences, that is better results for tests that measure the five linguistic skills: listening, reading, writing, spoken interaction and oral discourse.

Although most appreciated for their validity and fidelity, as well as for the easy manner in which they can be graded, the multiple choice tests have been excluded from this research from the very beginning simply because they assess very specific aspects about the language and its functioning. Or the objective of this research aimed at the development of communicational competences and not at the way in which the student is able to manifest abstract knowledge about the language and its functions.

Hs2: by adding a qualitative assessment criterion (the attitude) that has been adapted from the sociologic aria of document analysis to the assessment grid we get more test papers that pass the test than if we had if we assessed those papers using exclusively a linguistic quantitative criterion

In other words, we believed there are more papers that deserve to pass based on a communicational criterion than the traditional tests allow.

Besides, the teachers use this qualitative-attitudinal component being more or less aware of this, and this happens not only during testing.

Being more or less aware of this, the teachers will form an opinion on each of their students based on the way they write a paper (the penmanship, the way they use the blank page, etc), based on the way they talk during the seminars (the way they formulate the questions, the tone they use, their body language, if they speak to their colleagues during the classes, etc), based on the way in which they read a text out loud or the way they listen to a material.

Although very seldom assessed in a consciously manner, the non-verbal and para-verbal aspects of the messages are present in all of our communications, they influence the way we relate to people and what they have to say. In fact, most of the

times, these are the elements that make us decide that a person shows a positive or negative attitude, that this attitude is proper or improper for that specific communication and their communicational partners.

The research was based on the construction of **two independent variables**:

The first independent variable is represented by the presence of the formative intervention during the teaching process of the experimental group. The components of this intervention are given by the contents and the specific methodologies.

The second independent variable is represented by the three testing moments, that is the docimologic tasks elaborated in the form of situations and which have been administered during the three stages of the experiment as well as their assessment criteria.

The dependent variables are represented by the students' test papers. Basically, the dependent variables are the communicational competences manifested by the students in the test papers, that is the linguistic component of their responses and the attitudinal component that is present in these responses.

Since the two sample groups of students that we created during the pre-testing have proven to be equivalent, we decided to keep the same groups during the experiment. Thus, we still have two groups, each having 50 students from the second year, enrolled at the same faculty and specialization and having equivalent general and communicational profiles. In addition, their membership to the groups is mutually exclusive.

The teaching contents of the research was built around two operational objectives for the development of communicational competences. Both objectives focused on writing tasks based on given situations.

In order for the documents produced by the students to be as authentic as possible, the characters involved in the situations are either public people and movie stars, or people from the immediate background of the students. Apart from the authenticity of the documents, the situations aim to provide information for the assessment of the students' attitude towards the written document and implicitly towards the recipient or the reader of that document.

The writing tasks are of two kinds, based on the two operational objectives.

The first operational objective required the students to write authentic documents that belong to the professional life of the engineer (business letters or technical specific documents) that had to be elaborated based on the transfer of information from the documents attached to the task (authentic documents and audio-visual materials that have not been didactically processed) towards the final product.

The second objective required the students to elaborate the same type of documents, but this time the students had to use their personal knowledge and experience to complete the tasks. In other words, the tasks required the students to operate with personal experience regarding the topic of the tasks.

The experiment we suggested is based on **teaching materials** that contains authentic documents and messages that are used for the purpose they have been created. This means that the students had to be exposed to such documents and operate with them in this manner during the semester, so that the docimologic tasks could ask them to produce communicational events based on situations similar to those used during the semester and to those encountered by the engineers at their workplace. The authenticity of the documents elaborated by the students (that is if they are acceptable as communications from the point of view of the attitude adopted) has been at the foundation of the working hypotheses, together with the fact that this approach could deliver better results at tests than the traditional approach.

Given the fact that the students are technical students, the teaching materials were technical documentations, scientific articles and user manuals.

Operating with authentic materials and documents is not something new, in fact they are normally part of the teaching approach used by teachers of English in the Technical University of Cluj Napoca (Granescu M., 1997). However, the innovation is in the way they have been used in this case. Usually, the English seminars in the Technical University of Cluj Napoca use authentic documents to create translation exercises, fill in the blanks type of exercises („insert the right word in the blank space”, „fill in the blanks with the proper verb and tense”, „rearrange the text in its original form”, „read the text and comment the statement in an 150 word essay”, „rearrange the text to write the letter”,

„create a dialogue based on the information contained in the text”, etc.). The manuals and teaching materials are the ones available in the university library which are completed by adapted texts extracted from technical books, magazines or the internet.

The current teaching method focuses extensively on working with the authentic text that becomes a basis for the lexical and grammatical specific objectives. The text is read, commented, analysed from a lexical and grammatical point of view and then the students have to solve several types of exercises that will assist them in consolidating the elements of the lesson.

This method has certain shortcomings, the biggest one being the fact that the authentic documents are no longer used for the purpose they have been created. They become the basis for lessons in which the teachers teach about the language and its functions. Basically, the authentic documents are introduced as a foundation for teaching grammar and other linguistic structures, and that is why those texts lose their substance and their authenticity. Used this way they lose their power to assist the instructional process and the development of communicational competences in English, and the student will no longer recognize those texts as informative and formative valuable instruments, but rather they become just some exercises that need to be solved.

Douglas (2005) claims that documents lose their authenticity the moment they are no longer used for the purpose they have been created. He gives the example of some lab notes that lose their authenticity when transformed into multiple choice language exercises – grammar or vocabulary.

This change in paradigm implies that authentic documents and texts carry vital information about the way they have been created.

Usage of authentic texts facilitates the development of communicational competences by the inclusion of attitude in this process. The students are actively involved in this learning process and go through all the learning and evaluation steps that are presented in Bloom's taxonomy: the students identify, define, describe, elaborate categories of elements, use them in new contexts, analyse, decide, synthesize and evaluate.

The methodology created for the new approach in working with the teaching materials represents a synthesis of a four-stage strategy built on the foundations

provided by three training methods used in the industry: TWI, LCCI and Technical Communication. All three methods have been presented in detail in the thesis.

Synthesizing these three training methods, the teaching materials have been organized in the form of situations and the learning strategy was formulated in four steps:

1. understanding the task
2. collecting relevant information
3. writing the document
4. checking the work

To assess the progress made by the experimental group by the introduction of the elements of the experiment, we decided to create new docimological tasks based on several reasons:

1. Just like in the case of operating in the traditional way with authentic documents during the lessons, the tasks that require the students to operate with authentic texts in the same manner damage the authenticity of the text itself. Basically, the tests ask the students to perform the same operations on authentic texts like the ones performed during the seminars. Thus, the need for docimologic tasks that will use the authentic documents for the purpose they have been created.
2. Since our main objective is to assess communicational competences and not just the linguistic foundation of the communications, the tasks have to be authentic and representative for the real-life situations in which those competences will be applied (Douglas, 2005). Therefore, the authenticity of the tasks lies in the very fact that it represents a specific form of communication. In our case, this is the specific area of the professional life of the engineer working for an industrial or commercial company.
3. The competence is an integrated and quantifiable set of learnt knowledge, skills and attitudes that facilitate the accomplishment of a professional or personal development task. Thus, we would not be able to assess communicational competences but in the very specific context of communication, muchlike English

for specific purposes, which has very specific lexical, semantic, syntactic and even phonologic contexts (Douglas, 2005). In other words, we needed to create docimologic tasks that will represent very precise work-related ones based on very precise created situations that provided an air of authenticity to the communication.

We kept the same background for the tasks as in the case of the pre-testing tasks and we created the tasks on the same principle like the pre-testing tasks called “The Aston Martin DB9” and “Instructions for granny”. So, the tasks have been presented in the form of situations that describe a real-life-like scenario.

As for the assessment criteria, they are the same as those used during the pre-testing stage. Thus, for the quantitative analysis we used the same evaluation instrument offered by the Common European Framework for Languages (CEFL) for the linguistic part of the communication. An innovative element in connection to this evaluation grid is the fact that this grid has been adapted to the English for specific purposes, in this case for the English language used by engineers. We kept all the original levels but the examples and the particular cases have been replaced with example and situations that belong to the professional life of the engineer.

The second criterion comes from sociology and has been used to evaluate the test papers from a qualitative point of view. Basically, the qualitative analysis is an analysis of the documents produced by the students in the test papers. What we wanted to emphasize by using this evaluation criterion was the students’ concern for the task (Ilut, P., 1997) and implicitly their attitude towards the recipient. That is why this criterion has been called the attitudinal criterion.

This is not the first time such an assessment criterion is used to evaluate linguistic and communicational competences in English. For example, the professional training centre London Chamber of Commerce and Industry Examination Board has been training professionals in English for more than 120 years and takes into account such a criteria when assessing papers written by their candidates.

Thus, using this assessment criterion, we analysed whether the students adopt a proper attitude towards the recipient or not. We focused on elements like: tone

used, using the proper customary practices when addressing a certain position, layout, the manner in which the ideas have been organized so that they provide a reader-friendly message.

Re-testing took place at the end of the second semester.

Entitled “Reservation of a conference hall”, this task asked the students to write a letter to the teacher to book a hall for a training session they had to prepare. They also had to request the necessary equipment such as video projector, laptop, sound system, etc. None of the activities carried out during this second semester did not deal with writing letters of any kind.

The scenario was created to meet a double purpose. On one hand, the letter aimed to evaluate the preservation of the communicational competences developed during the first semester and on the other hand, the letter was part of the semestrial evaluation, the students could not deliver the training session without reserving the hall first.

Just like in the case of the other tasks administered during the pre-testing and post-testing, the test papers were assessed using the two evaluation criteria – the linguistic and the attitudinal – monitoring the way in which the students developed and preserved their communicational competences.

Results and discussions

The experiment performed using the new teaching materials involved a great change in the way the technical students operate with authentic documents and specific texts during English seminars.

The statistical analysis of the results obtained after administering the docimologic tests and their assessment using the two criteria – linguistic and attitudinal – show that there are statistically significant differences between the two groups of students after the experiment. Chapter 6 of the thesis presents detailed analyses conducted using both evaluation criteria and statistical instruments.

The statistical results presented in chapter 6 show that we have significant progress of the experimental group in what the development of communicational competences in English is concerned after being exposed to the formative intervention for

the duration of an academic semester. It is worth mentioning the fact that the numbers show significant progress not just in respect to the development of proper attitudes towards the recipient of a message, but result show a significant progress in the development of linguistic competences as well, which means that operating with authentic documents for the purpose they have been created assists the development of knowledge, linguistic skills and proper attitudes in communication, which means the approach develops communicational competences in English.

Apart from the statistical data collected, we think that the students' reactions towards this approach, collected subjectively and empirically are also very valuable and are worth mentioning.

Therefore, in addition to the statistical instruments applied to the quantitative data collected and which show the progress made by the experimental group, we also performed a SWOT analysis of the experiment and the way in which the students from the experimental group coped with the new approach. This qualitative analysis is to be found in chapter 8 of the thesis, the one dedicated to the conclusions of the research. We wish to present just a few of them in this abstract.

One of the strong points is the increase in the interest the students showed for the English seminars. This is a very important aspect, especially in the case of this experimental group, since the syllabus allows the English teacher to give only Pass or Fail, as opposed to regular marks from 1 to 10 for the students from other faculties and specializations.

In addition to this increased participation to the English seminars, we noticed an increase in the implication of the students in the educational activities of the seminars, by an increase in their reactions towards the tasks and the increase in their interaction with each other. In this respect we noticed an increase of the number of discussions the students spontaneously started amongst each other in connection to the texts or the audio-visual materials used in class.

The weak points of the experiment come mainly from the fact that we operated with authentic documents for the purpose they have been created. A large portion of these weak points has been corrected during the experiment, but only further researches can eliminate all of them.

One of the weak points that we managed to correct was an initial tendency of the students to take the English seminar very lightly. For example, although the students participated in a very large number to the seminars, we overheard a conversation between one of the students from the experimental group and a control group student in which the experimental group student “bragged” to his fellow student that “we are not going to do much this semester, we will mainly watch a lot of movies.” This statement was criticised during the following seminar, re-emphasizing the fact that the movies are being watched for the purpose mentioned in the scenarios.

A series of threats are born from the conservatism of the current system of evaluation of the students’ performances. On one hand, the subject called “English” tends towards a docimologic system that has to be as objective as possible. Thus, the summative evaluations demand tests and evaluation criteria that are compatible with the evaluation system used by the faculty or the entire university. This poses a threat upon the evaluation grid adapted after the Common European Framework for Languages, which can be used only as a self-evaluation instrument or at best as a formative evaluation instrument.

Another series of threats could come from the conservatism of the teaching staff who might consider that the attitudinal elements might damage too much the objectivity and fidelity of the tests and their results, thus reducing the attitudinal components to the formative level of evaluation which, although extremely important, does not carry the same weight in the eyes of the students – who are more preoccupied by passing exams than preparing for the future profession.

The results collected from the three moments of the experiment – pre-testing, post-testing and re-testing – present significant fluctuations in what the value of η^2 is concerned and in connection to the two assessment criteria used, thus confirming the fact that introducing an attitudinal criteria does not taint objectivity, being in fact extremely beneficial for the educational process thanks to the backwash effect of assessment. All the tasks administered are presented in the Annexes of this abstract.

Thus, the pre-testing task entitled “Aston Martin DB9” shows an equal level in the values of the two criteria for the experimental group, which means that the two criteria do not present any statistical significant difference (table 1 and 2).

AJ - GE	Pass	Fail	Total
CEFL	19	31	50
ATT	22	28	50
Total	41	59	T = 100

$$\chi^2 = 0,37$$

Table 1 – statistical analysis of the difference between the linguistic and attitudinal criteria for the experimental group – „Aston Martin DB9” letter for Angelina Jolie

JC - GE	Pass	Fail	Total
CEFL	27	23	50
ATT	23	27	50
Total	50	50	T = 100

$$\chi^2 = 0,64$$

Table 2 – statistical analysis of the difference between the linguistic and attitudinal criteria for the experimental group – „Aston Martin DB9” letter for Jeremy Clarkson

The task entitled “Instructions for granny” did not present any positive results from the point of view of the attitudinal criterion, because, as stated in that sub-chapter, the students test papers do not represent authentic communicational artefacts, but rather a manifestation of knowledge and practical skills used to create a phone conversation with results that are always positive and acceptable in the eyes of the communicational partner.

“How the printer works” and “Car technical specification” administered during post-testing show a significant improvement of the performances of the experimental group versus the control group for both criteria (tables 3 and 4):

ATT PRINTER + TECH SPEC	A	R	Total
GE	29	21	50
GC	18	32	50
Total	47	53	T = 100

$$\chi^2 = 4,85$$

Table 3 – “How the printer works” and “Car technical specification” – calculating statistical differences between the two groups of students for the attitudinal criterion

PRINTER + TECH SPEC	A	R	Total
GE	36	14	50
GC	24	26	50
Total	60	40	T = 100

$$\chi^2 = 6,00$$

Table 4 – “How the printer works” and “Car technical specification” – calculating statistical differences between the two groups of students for the linguistic criterion

These statistic calculations might show a paradox, since the values of χ^2 for the two criteria demonstrate not only that we have a definite progress in the case of the experimental group, but that, at least for these two tasks, the progress is statistically more significant in the case of the linguistic criteria in a situation when we did not have any traditional grammar or lexical exercises done with the students except what they have done individually at home.

However, the task entitled „Letter for mom” presents significant differences recorded by the experimental group only in the case of the attitudinal criterion, the linguistic criterion showing no sign of statistic difference between the two groups of students. (tables 5 and 6):

ATT LETT MOM	A	R	Total
GE	34	16	50
GC	24	26	50
Total	58	42	T = 100

$$\chi^2 = 4,10$$

Table 5 – “Letter for mom” – calculation of statistical difference between the two groups of students for the attitudinal criterion

LETT MOM	A (B2)	R (B1+A2)	Total
GE	21	29	50
GC	12	38	50
Total	33	67	T = 100

$$\chi^2 = 3,66$$

Table 6 – “Letter for mom” – calculation of statistical difference between the two groups of students for the linguistic criterion

In the end, the re-testing shows a stagnation, that is of preservation of the communicational competences from a statistical point of view of the results obtained by the experimental group for the two evaluation criteria (tables 7 and 8):

LETT MOM VS CONF HALL	A(B2)	R(B1+A2)	Total
LETT MOM	21	29	50
CONF HALL	19	31	50
Total	40	60	T = 100

$$\chi^2 = 0,16$$

Table 7 – “Reservation conference hall” vs. “Letter for mom” – calculation of statistical differences between the two tasks for the linguistic criterion

ATT LETT MOM VS CONF HALL	A	R	Total
LETT MOM	34	16	50
CONF HALL	27	23	50
Total	61	39	T = 100

$$\chi^2 = 2,05$$

Table 8 – “Reservation conference hall” vs. “Letter for mom” – calculation of statistical differences between the two tasks for the attitudinal criterion

But perhaps the most important aspect should not be identifying numerical or statistical differences that could demonstrate the opportunity of introducing a holistic system of evaluation which could be less objective and which could take into account attitudinal aspects of communication, but rather identifying the driving force behind the English seminars for technical students.

On one side we have the traditional system of evaluation that takes into consideration only very clearly cut linguistic aspects and has the support of objective docimologic tests that produce very measurable and quantifiable results and which can be

compared to a norm, which however fail to develop real communicational competences. On the other side we find tests which, by giving up some of the strict objectivity and docimological rigour, stimulates the students to develop communicational competences and encourages them to subjectively and attitudinally invest in communication, thus realistically preparing them for real communicational situations.

Oportunities for futher research

Naturally that, if in the case of the weak points we could elaborate further research that leads to the strengthening of those weak points, in the case of threats – which represent external aspects and upon which we do not have almost any control – the only thing we can do is to regard them as oportunities in disguise which could be transformed in useful tools for further research.

The most important oportunity we notice in connection to this thesis – that of adapting the university training at English to the demands of the professional environment of Cluj Napoca – the first location that would hire technical graduates – is represented by the desire of the university itself to adapt the entire university training in order to optimize their professional insertion. Thus, any approach that has this objective has to be welcomed and must become the driving force of the change in the paradigm of higher education training.

This opening towards the labour market and the community in which the graduate students will develop their careers represents an oportunity for the linguistic centres and university language departments to diversify their educational offer and to create manuals and coursebooks that are adapted to the learning needs of their students and at the same time adapted to the needs of the industrial and commercial community which, as the survey shows, contains both multinational branches and domestic companies, all hiring and in need of qualified workforce trained in a university.

This PhD research tries to align the university training of the students from the bachelor level to the requirements mentioned by the methodological documents issued by the National Agency for Qualifications in the Higher Education in Partnership

with the Economic and Social Environment regarding the development of competences that form the foundation of specific qualifications for each professional area.

Thus, by changing the contents that we teach and assess, we think we contribute to the development of communicational competences not just in English but also in the first language of the students, being known the fact that one of the characteristics of competences is their very ability to operate in new contexts. By using an extra attitudinal assessment criterion we contribute to the elaboration of new assessment criteria that lead towards the holistic and qualitative assessment of test papers. In addition, by using authentic documents for the purpose they have been created, this approach supports the transversal character of communicational competences, by combining specific linguistic elements with specific professional elements. Moreover, the new approach stimulates the consolidation of autonomous learning and the development of self-evaluative instruments, much needed for a healthy endeavour aimed at the life-long learning.

So the research performed during the doctoral training encourages us to continue with the publication of an English coursebook that will meet the needs of technical students – future engineers.

Key words

Communicational competences, assessing communicational competences, Common European Framework for Languages, Common European Framework for Qualifications, linguistic criterion, attitudinal criterion, operating with authentic documents, English as curricular teaching subject

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Tasks administered pre-testing

“The professional life of the engineer”

1. Johann works as an engineer for BMW. Write about the work of Johann (minimum 10 activities). Think of the activities he may do on a regular basis. Use the the two colums below. You may think of other activities that can be part of a regular schedule. Example: *He attends training programs once a year. Or, He never writes business letters.*

<p>Always Never Sometimes Rarely Every day Every month Once a year On weekends On Christmas On holidays Every week Every second Tuesday When the boss asks him/her to</p>	<ul style="list-style-type: none"> - writing business letters - reading user manuals - writing user manuals - reading emails from superiors, colleagues or team members - writing emails to superiors, colleagues or team members - browsing the internet to look for fresh jokes - reading memos - writing memos - listening to conferences - giving presentations - preparing reports - talking to clients - business dinners - social events - participating to staff meetings - chatting with friends - giving and receiving phone calls from clients - attending training programs
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“The Geometry Lesson”

2. Using the text, but also your personal knowledge of geometry, write definitions for: planar figure, solid figure, area, volume.

A two-dimensional figure, also called a plane or planar figure, is a set of line segments or sides and curve segments or arcs, all lying in a single plane. The sides and arcs are called the edges of the figure. If all the edges are segments, every vertex is the endpoint of two sides, and no two sides cross each other, the figure is called a polygon. Polygons are classified according to the number of sides they have, which equals the number of vertices. Polygons often divide the plane into two pieces, an inside and an outside. The inside part is called the region enclosed by the figure. The name of the figure is also commonly used for this region, and the area of the region is commonly called the area of the figure.

A three-dimensional figure, sometimes called a solid figure, is a set of plane regions and surface regions, all lying in three-dimensional space. These surface regions are called the faces of the figure. Each of them is two-dimensional. The arcs of curves that are the edges of the faces of the figure are called the edges of the figure. The endpoints of the edges are called its vertices. If all the faces are plane regions, every edge is the edge of two faces, every vertex is the vertex of at least three faces, and no two faces cross each other, the figure is called a polyhedron (plural polyhedra). Polyhedra often divide space into two pieces, an inside and an outside. The inside part is called the region enclosed by the figure. The name of the figure is also commonly used for this region, and the volume of the region is commonly called the volume of the figure. (adapted from www.wikipedia.org)

“Aston Martin DB9”

Situation 1: You are an engineer for Aston Martin Lagonda Ltd. UK. Your job is to offer technical assistance to the company’s clients. Today you receive letters from two important clients: Jeremy Clarkson and Angelina Jolie. They both want to buy an Aston Martin DB9. Decide what information you will give to each of them and write letters of response. You can use the technical specifications provided and you can use your personal experience to offer them other bits of information as well.

Aston Martin DB9 Volante 5.9 i V12 48V (2003–...)



Manufacturer	Aston Martin Lagonda Ltd.
Model	DB9 Volante 5.9 i V12 48V
Issued in	2003–...
Body type	cabrio
Number of doors	2
Number of seats	4



Body and Exterior Features

Full weight	1830 kg	Wheelbase	2740 mm
Length	4697 mm	Front track	1568 mm
Width	1875 mm	Rear track	1562 mm
Height	1318 mm	Ground clearance	120 mm

Engine

Engine location	front along	Engine design, number of cyls	V12
Fuel	petrol	Displacement	5935 cc
Fuel supply system	Distributed injection	Bore	89 mm
Max power	331 kW (450 HP) at 6000 rpm	Stroke	79.5 mm
Max torque	570 N·m at 5000 rpm	Cam design	DOHC
		Valves per cyl	4
		Total number of valves	48
		Compression ratio	10.3 : 1
		Aspiration	N

Transmission and Performance

Transm. type	Num of gears	Wheel drive	Acceleration to 100 km/h	Max speed	Fuel consumption, ltr/100 km			
					City	Road	Mixed	Euro
manual	6	RWD	4.9	300	25.2	12.2	—	—

Chassis and Suspension

Front brakes	vented disc	Standard tyres	235/45-275/35 R19
Rear brakes	vented disc		

“Instructions for granny”

Situation 2: *You work as a help desk engineer for Hewlett Packard. You assist clients over the phone. A very nice old lady has just bought one of your ink jet printers. Unfortunately the instructions provided with the printer are in Egyptian and the manual has no pictures. She calls you for guidance. Give her step by step installation instructions over the phone (write down what you would tell her over the phone).*

Tasks administered post-testing

“How the printer works”

Situation 1: *This week, your company has planned a series of events designed to enhance the team spirit among the departments. Today all the employees brought their children along to show them where they work. Since you work in an office that uses an ink jet printer, you decided to tell the children about the*

functioning of such a device. You searched the internet and you found a text that explains the process of printing, but it has too much information and the children would probably get bored. Extract the main steps of the printing process as a basis for your presentation.

When you click on a button to print, there is a sequence of events that take place: The software application you are using sends the data to be printed to the printer driver. The driver translates the data into a format that the printer can understand and checks to see that the printer is online and available to print. The data is sent by the driver from the computer to the printer via the connection interface (parallel, USB, etc.). The printer receives the data from the computer. It stores a certain amount of data in a buffer. The buffer can range from 512 KB random access memory (RAM) to 16 MB RAM, depending on the model. Buffers are useful because they allow the computer to finish with the printing process quickly, instead of having to wait for the actual page to print. A large buffer can hold a complex document or several basic documents. If the printer has been idle for a period of time, it will normally go through a short clean cycle to make sure that the print head(s) are clean. Once the clean cycle is complete, the printer is ready to begin printing. The control circuitry activates the paper feed stepper motor. This engages the rollers, which feed a sheet of paper from the paper tray/feeder into the printer. A small trigger mechanism in the tray/feeder is depressed when there is paper in the tray or feeder. If the trigger is not depressed, the printer lights up the "Out of Paper" LED and sends an alert to the computer. Once the paper is fed into the printer and positioned at the start of the page, the print head stepper motor uses the belt to move the print head assembly across the page. The motor pauses for the merest fraction of a second each time that the print head sprays dots of ink on the page and then moves a tiny bit before stopping again. This stepping happens so fast that it seems like a continuous motion. Multiple dots are made at each stop. It sprays the CMYK colors in precise amounts to make any other color imaginable. At the end of each complete pass, the paper feed stepper motor advances the paper a fraction of an inch. Depending on the inkjet model, the print head is reset to the beginning side of the page, or, in most cases, simply reverses direction and begins to move back across the page as it prints. This process continues until the page is printed. The time it takes to print a page can vary widely from printer to printer. It will also vary based on the complexity of the page and size of any images on the page. For example, a printer may be able to print 16 pages per minute (PPM) of black text but take a couple of minutes to print one, full-color, page-sized image. Once the printing is complete, the print head is parked. The paper feed stepper motor spins the rollers to finish pushing the completed page into the output tray. Most printers today use inks that are very fast-drying, so that you can immediately pick up the sheet without smudging it.

“Car technical specification”

Situation 2: *You work for a car dealership and one of the car makers you promote, Hyundai, has just launched a new model, the Hyundai i10. You have not yet received anything official from the manufacturer, however, you already have clients asking about the new car. All you could find was this car review written by a very reliable source. Read the article and draft the technical specification of the car.*

Give the Hyundai i10 a few years and it'll be the fastest car in the world. Sceptical? Check out the stats. This is the new 1.2-litre petrol version and, despite the engine being just 162cc larger than the base-spec petrol, it's 18

per cent more powerful, 20 per cent more torque and – despite achieving the same emissions and economy – three seconds quicker to 60mph. OK, so we're still talking pretty modest numbers – 77bhp, 87lb ft and 12.8 seconds respectively – but imagine if they keep up that rate of progress with subsequent generations of engines. If they keep going at this rate, by the time they've fitted a 1.6-litre engine, it'll put out 160bhp and hit 60mph in 0.8 seconds. That's pretty quick. In the meantime, though, this i10 will do just fine. Put simply, it's a proper little cracker. Don't be fooled by the i10's pensioner-spec exterior: there's plenty of clever tech going on in the engine here – hydraulic lash adjusters, beehive valve springs and an offset crank – all of which combine to make the i10 feel quite unlike a budget city car. It's almost silent at tickover, revs cleanly and – thanks in part to sensible gearing – is unobtrusive even at motorway speeds. There's enough power for all the around-town stuff: it's only when you start loading the i10 with shot-putters that it starts to strain. And – whisper it in case it invalidates your five-year warranty – the i10's actually a bit of a laugh to drive. OK, the skinny tyres mean grip levels are tenuous at best, but the i10 is so light that it'll happily indulge in a bit of 205 GTi-style silliness on wet roundabouts. Compared to its three-cylinder rivals from Citroen, Peugeot and Toyota, the i10 is in a different league. The new Ka? Close one. Before I implode in a flash of eulogy, there are a couple of quibbles. Reach-adjustable steering would be nice, and do wonders for the slightly awkward seating position. And, if we're being honest, the i10 still looks like the sort of car you'd find parked in droves outside a south-coast retirement home. But ignore all that. Even the top-spec 1.2 is just over eight grand – only £200 more than the vastly inferior 1.1-litre i10 – and you get alloys and electric stuff and basically everything you could ever need from a little city car. And it'll manage 56mpg and sneak under the 120g/km CO2 tax bracket. What more could you want? Apart from that imminent hypersonic version...

Sam Philip – Top Gear

“Letter for mom”

Situation 3: *Your mother wrote you a letter saying that she is thinking of buying a car for herself. Consider various types of vehicles (size, type of car, type of engine, etc) in terms of advantages and disadvantages and write her a letter of response.*