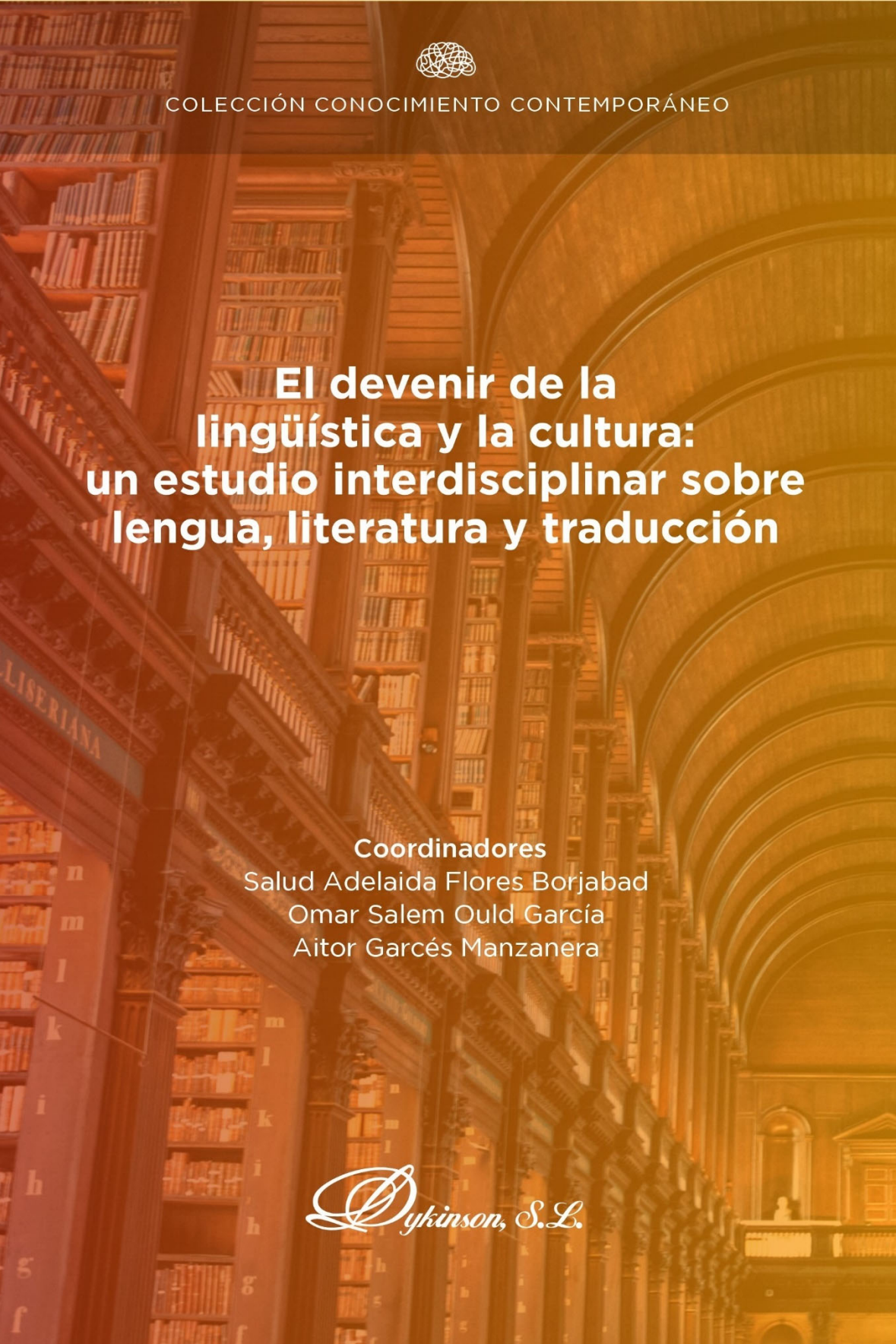

COLECCIÓN CONOCIMIENTO CONTEMPORÁNEO

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Coordinadores
Salud Adelaida Flores Borjabad
Omar Salem Ould García
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THE USE OF TED TALKS TO IMPROVE ORAL SKILLS IN ENGINEERING STUDENTS

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1. INTRODUCTION

This paper is characterized, first of all, by its interdisciplinarity, since it converges, and in an unusual way for an undergraduate of a polytechnic university, three aspects of scientific dissemination: engineering content, the transmission of contents orally said in an effective way following the model offered by the TED conferences, and the use of English as a language of scientific transmission.

Although the work addresses philological issues related to oral communication strategies, its most important contribution lies in the fact that the focus from which it starts has been moved from this more usual field (that of the linguist) to that of the engineer, in an effort to highlight for the latter group in general, and from the Spanish context in particular, the importance not only of the knowledge acquired, but the need to transmit it to society as a whole in an agile and effective way. This constitutes, therefore, the main objective of the study.

To achieve this objective, the core of the study is made up of the analysis of one TED conference related to a field of engineering, and specifically with subjects of the Degree in Engineering in Industrial Electronics and Automation and other related degrees, as they are currently taught. The methodology followed is similar to that of a "text analysis" in which aspects of the scientific dissemination previously shown come together in different ways. It is, therefore, a step-by-step breakdown of the form / content tandem, intended for the engineer, to “park” his attention to his formulas and tables and look up towards the

public, diverse, but with a great interest, in front of which it has the urgent necessity to explain his findings and investigations.

We consider that this novel approach of an engineer to his own science (from the need for communication) can open parallel paths to the investigation of a specific content in itself in the Spanish university. There is no reason why the Spanish engineer cannot carry out a communication in TED format in their own language, with which this study could represent, as an additional contribution, a starting point for initiatives of this type.

2. ORAL PRESENTATIONS FOR SCIENTIFIC-TECHNICAL OUTREACH IN THE ENGLISH LANGUAGE

2.1. Background of scientific-technical dissemination

The dissemination of scientific-technical information, in principle written in the form of essays and articles in magazines and in the press, is one of the most important and influential parts in the transmission of knowledge, as it has been practiced ever since. In the 17th century in the West, Sir Francis Bacon updated the classical format of the scientific essay and scientific societies began to be created. With his Novum Organum (1620), Sir Francis Bacon "bridged that vast and deep chasm that separates the ancient from the modern" (Rodwell, 1879, 262–264). The work deals with the logic of the scientific-technical procedure, proposing a new method focused on the search for knowledge in an experimental way. This contrasts squarely with the way in which knowledge was conceived until then, since an Aristotelian philosophy was followed in terms of deductive reasoning, totally contrary to the trial and error method. This philosophy allowed a moderately educated citizen to master all the vocabulary available in his society in terms of trades, materials and other elements of nature, since it was basic and not very specific knowledge.

A little later, especially from the second half of the 18th century with the Industrial Revolution in England, this scientific-technical dissemination spread at the same speed with which society evolved, first in

Great Britain, and later in Europe. This economic, social and technological transformation that emerged resulted in a need for the dissemination of much more specific content, with a level of knowledge that was much more complex than that possessed by society until then. This is how new concepts arose caused by an increase in the level of knowledge of society, as happened, for example, with the division of sciences and letters, a concept that emerged during the Enlightenment, but which today is so integrated in our society that we accept as a universal truth (Dertouzos et. al.). Since then, the scientific vocabulary remains solely in the hands of scholars and exclusively in the field in which such knowledge is concentrated.

Already in the 20th century, the development of science runs parallel to the militarization of the European continent. The century, undeniably marked by two world wars and a cold war, leaves the greatest discovery made to date: the Internet. This discovery, initially called Arpanet, arose in 1969 from the military context in which a large part of the globe was located and began as a distributed network with four computers located in different universities in the United States (Cid and Allepuz, 2004). Dertouzos predicted that the internet would be an information market where people and their computers will freely buy, sell and exchange information and information works (Dertouzos et. al.). When its use for scientific and academic purposes was extended, an unprecedented transmission of scientific-technical information emerged, multiplying in speed and capacity, which provided access to much more population to specialized knowledge, with which the dissemination effort was still made.

2.2. Characteristics of effective oral communication

The crux of the matter, from the perspective of this communication, is that the "what" is the "how". That is to say: the use of English imposes a concrete and effective way of presentation, which does not mean that it is not exportable to communication in other languages. Prior to the popularization of TED Talks, on the pages of Anglo-Saxon universities we found precise instructions for effective oral communication: the "Assertion-Evidence Approach" (Penn State University).

It is a totally different way from the ones we know of presenting a scientific, technical or any specialty work in front of an audience in a room in the traditional ways. Through this approach, a coherent and compelling story of a job or study is projected to the public through "messages" rather than lists of miscellaneous knowledge. These messages should be short and simple, and are usually accompanied by images or small drawings that make the receiver able to quickly assimilate the concept that is being presented. The presentation is elaborated at the moment, built on these short messages, referring to deep topics but sufficiently schematic so that the receiver does not consider himself incapable of understanding them in their entirety. The new presentation technique endows the speaker with a great capacity for improvisation and confidence (acquired with practice) that would otherwise be impossible. This "rehearsed improvisation", transmitted with evident confidence, is also felt by the audience, thus facilitating greater attention in the speech and avoiding distractions during it.

In addition, there are certain recommendations to take into account for good oral communication. These are:

1. Avoid using too complex vocabulary. Very technical or scientific jargon can be a barrier for non-experts in the field and will mean that they are not interested in the presentation, since they will consider it very complex. This increases the probability that the audience will stop paying attention and lose the thread of the presentation and, therefore, the message that you want to convey. Simple and accessible words should be used, so that all recipients of the message can clearly understand what is being explained, without incorporating unnecessary technicalities or acronyms.

2. Avoid so-called "bullet points". This concept consists of the presentation of a transparency with a list of points or numbered sentences in which there is only text, which is not only boring for the reader, but also, by showing a large amount of text, forces the brain to exert enormous effort, which can lead to neglect or an unconscious loss of attention (Melissa Marshall, Talk Nerdy to Me, 2012).

As mentioned above, instead of "bullet points", what is currently used in universities, such as MIT or Penn State, is the Assertion-Evidence Approach technique. The use of good images helps to convey the point of view in an attractive and simple way. Graphs, diagrams or even auditory messages are also great resources to convey the desired information to the listener in an interesting and novel way.

3. Characteristics of the public. It is also important to be aware at all times of whom the speaker is addressing, as there are different types of audience and each of them require special preparation, based on their characteristics. These characteristics could be the age and training of the attendees or the room and region where the presentation is held. These singularities inherent to the audience can mark a large part of the writing and presentation of a speech, both in content and in form. What we should not lose sight of is the need for an expert in any scientific-technical matter to be able to disseminate, that is, to explain complex concepts without excessive complications to a public who want to be well informed.

In addition, it is necessary to be clear about the purpose for which a text is pronounced. It is different to approach a speech to convey novel information on a current topic, to try to persuade the audience to accept another point of view, or to encourage the public to take action against something specific.

4. Structure of discourse. Defining a clear structure of the speech will help to organize the information and to remember the key ideas that you want to convey. The public will be able to be guided in this way in an easy way, without losing the thread, by the topics that are going to be discussed. The structure of the presentation should be a basic structure, with introduction, body and conclusion. This type of structure clearly delimits the parts of the speech, so it constitutes a simple guide for following it.

2.1.1. Introduction:

In this first part, it is essential to involve the audience, that is, to make the public interested from the first moment. This will be key in the future of the presentation. Such an objective can be achieved by asking a question, posing a problem or showing a very short video, in which you can see the path that the speaker is going to take.

2.1.2. Body:

The body should contain a clear structure as far as the main ideas are concerned. Key points will be discussed one after another, recommending a maximum of three and avoiding burdening the listener with too much information. The most important points and concepts that may be more difficult to understand will be explained in detail, speaking more slowly and speaking more clearly than usual if necessary.

2.1.3. Conclusion:

In this last part, the key points and main conclusions should be summarized, emphasizing the message that has been wanted to convey. The provision of new information should be avoided and also ended abruptly. This is easily accomplished by flipping a question or leaving one or multiple possibilities open. Closing the conference with a personal anecdote makes the audience identify with the speaker.

5. Rehearsal and practice. Practice, as already noted, is essential in a good presentation. Repeating the speech several times, standing up and out loud, before facing an audience is very beneficial to control duration time, pauses, breathing, etc. Maintaining a relaxed and positive posture, with your hands always visible, will influence the audience and keep the attention on the speaker. In addition, you must be aware at all times of the tone and volume of the voice used, emphasizing at times that require it and taking pauses where appropriate.

6. Feeling of closeness. The visual and repeated contact on many occasions with the audience shows security and sufficiency, which transmits complicity and sincerity, the viewer feeling that he is really being helped to understand what is being explained. The use of rhetorical words,

strategic repetitions or deliberate long pauses give the presentation an emphasis that attracts the audience, generating greater expectation and focusing all the attention on the speaker.

7. Not reading and leaning on the equipment. In no case is it recommended to read the speech from beginning to end, since it is not very attractive to see someone read a piece of paper. Small cards instead of a large sheet of paper can help you follow the order of the presentation, avoid reading excessively, and maintain eye contact with the audience.

Knowing the equipment that is going to be available and knowing how to handle it with some ease will be very important in order to avoid, as far as possible, any problem with it during the talk. It is good to use the equipment, for example, to control the times or to develop a series of slides.

8. Non-verbal aspects. Head movements are an important aspect in this type of conference. Nodding or shaking the head to emphasize the message, or tilting it to the side expressing inclusiveness helps in the transmission of communication when properly coordinated with the verbal language. Hand gestures also provide extra emphasis to help the recipient of the message.

3. TED TALK ANALYSIS

3.1. Analysis characteristics

Once the use of TED talks and their importance in professional oral communication has been specified, this chapter will carry out an in-depth analysis of one specific talk. This has been chosen for its relationship with the contents studied in the Degree in Industrial Electronic and Automatic Engineering in particular, although it also presents similarities with contents of the rest of the degrees in industrial engineering, such as the Degree in Mechanical Engineering among others. Due to the limits of the extension of a degree project, we have reduced the analysis to one talk, since it has been preferred that it be exhaustive, to a less complete analysis of a greater number of presentations.

In this section, therefore, different characteristics such as the content of the talk, the expression and communication strategy of the speaker or the effectiveness of the communication will be studied. All this always keeping in mind, once again, the double objective of highlighting the importance of oral scientific-technical dissemination and the need to use English as a language of international communication. Not only because it is the shared language in this area but, at the same time, because through it those effective communication strategies are materialized that have popularized especially the Anglo-Saxon universities. In this way, it can be said that the "how" matters as much as the "what", in other words, the medium and the message come together to make science and technology accessible, and without losing rigor, to the common citizen.

3.2. Amos Winter: The Cheap All-terrain Wheelchair

This talk has been selected for bringing together a large number of topics related to the studies of the degree. This video by a young mechanical engineer and researcher at MIT (Massachusetts Institute of Technology), Amos Winter, made in 2012, deals with the needs of a person with reduced mobility to be able to move around. It seems logical that, in a developed country with acceptable economic capabilities, these basic needs do not pose any impediment to the daily life of the population. However, in a developing country it is very different. In such countries, where the majority of its inhabitants live in rural areas, it is necessary to travel many kilometers to go to school or work and, in many cases, through hard and difficult terrain. Winter observed that these series of conditions could be corrected with a wheelchair that implemented a different and novel design. To do this, he looked at mountain bikes, with which you can travel a long distance and on uneven terrain thanks to their chain of gears. Winter thought that using levers that offered more torque when greater force was needed would lead to lower speed, but would be suitable for rough terrain. The technique had already been implemented before, but the prototypes had a very high cost, and one of the premises of this project was that the cost could not exceed $ 200. The chair also had to be suitable to be used indoors and repaired in local

stores with basic tools. By means of levers and gears, a very simple mechanism is achieved with which the saddle acquires characteristics similar to a mountain bike, fulfilling all the premises mentioned above.

In order to analyze the content of the talk, the characteristics that are considered most important in terms of the transmission of knowledge will be studied below. It is necessary to clarify that the main aspect that is going to be analyzed will be the specific content block. However, the social aspects or expression and communication aspects are also important, since they imply the passage of the transmission of a specific content by the specialist engineer to society.

a) Specific content

1) Vocabulary:

Focusing this first part of the analysis on the vocabulary used, it is observed that the speaker addresses the audience with a technical lexicon. It can be considered that it is a fairly specific vocabulary and that it needs an audience with a minimum knowledge of the subject. This degree of specialization of the public must be necessary to follow the talk with certain guarantees, since, otherwise, it would not be easily understood. This occurs, for example, when the mechanism of a mountain bike is explained or when all the existing agents involved are discussed until the product is manufactured.

Below is a list of the most used technical words during the presentation:

i. Gear train, whose translation in Spanish is gear train. This set of words belongs to the knowledge of mechanics, which is included within physics. A gear is a set of sprockets nested together and a gear train is several connected gears. It can be considered one of the keywords of the project.

ii. Torque. This word is very specific, since only experts in the field know its meaning. It is a system formed by two forces parallel to each other, of the same intensity or module, but in opposite directions. It also belongs to the field of knowledge of physics.

iii. Lever. This word, perhaps the least technical of all, is best known for being used on a multitude of everyday objects such as tools or on doorknobs.

iv. Stakeholders. This word belongs to the business world and refers to the interested parties in a company or organization that allocates capital with the aim of obtaining a profit.

2) Relationship with the subjects of the Degree in Industrial Electronic and Automatic Engineering:

2.1) Main subject for product design

The subject of the Degree in Industrial and Automatic Engineering in which most of the concepts and vocabulary explained in the previous section are used is Machine Mechanics, taught in the second year. This subject allows to become familiar with this vocabulary and understand how these types of mechanisms work, thanks to which movement is achieved in something as simple as a bicycle, or in much more complex systems such as a motor. The basis on which the mechanism is based is simple: a low gear will achieve a lower speed, but a higher torque. Or, conversely, a higher gear will achieve lower speed, but lower torque. This makes it possible to adapt to the conditions of the terrain and to the desired speed at all times. The oldest known gear mechanism is an astronomical calculator dated between 150 and 100 BC. C. composed of at least 30 bronze gears with triangular teeth.

2.2) Other subjects related to design and manufacturing

On the other hand, the need to design a product focused on the end user, with a series of inherent limitations, increased the complexity of the solution. This casuistry required a very specific and particularized design, which entailed an exhaustive analysis of different parameters. Obviously, for all this study carried out by the MIT engineers, a high degree of training in mathematics is necessary for numerical calculation and, most likely, a large part of these calculations have been carried out using a computer program designed for it. In addition, at the same time, it is necessary to know information about the materials that are going to be used in the manufacture of this product and how they have been

manufactured, in case it is necessary to modify their properties. This entails relating a large number of subjects of the degree with this part of the analysis. In the first place, the subjects Mathematics I, taken in the first year of the degree and Mathematics II in the second year, for the calculation and resolution of algebraic problems and equations and Applied Informatics taught in the first year, to be trained in a programming environment and be able to skillfully handle specific software in mathematical calculation.

Secondly, the subjects Science and Materials Engineering taken in the first year would also intervene to know the composition of the elements, and the subject Strength of Materials, taught in the second year, to analyze the ability to withstand the efforts to which the product can be submitted. Finally, the subject Engineering of Production Systems would participate, whose contents are taught in the third year, which allows to know how each piece of the product has been manufactured and how its properties can be modified, if necessary.

Once the product has been designed and manufactured, a field study is necessary in which a sample of the population tests the prototype and returns some feedback in case the product is susceptible to improvement. In this part of the talk, a specific vocabulary is used, less technical, but no less complex for that. According to Winter, the product works "because rigorous engineering science and analysis have been combined with user-centered design." This phrase can overwhelm the viewer at a certain moment if they do not have prior knowledge as mentioned above.

2.3) Beyond theory: subjects related to the revision phase

Regarding the procedure for carrying out the field study, biomechanical data of the user were previously taken and later the new wheelchair was compared with a conventional chair, the results being quite positive. The new product allows greater speed, is more efficient and generates greater torque compared to a conventional wheelchair. On the other hand, there was also a lower oxygen consumption in the user due to the lower use of energy during the course of the test. These conclusions were possible thanks to an extensive collection of user data and its

subsequent analysis, which makes it possible to relate this fact to other subjects studied in the degree. In the Applied Statistics course, taken in the first year, you learn to manipulate a large amount of data in order to obtain rigorous results through its analysis. Likewise, to obtain biomechanical data of the user, an optional training in Biomedical Engineering is required, taken in the last year of the degree, which allows the impulses generated by the human body itself to be translated into data that can be recorded and analyzed by electronic means.

2.4) Subjects necessary for marketing and dissemination

Finally, Winter highlights the necessary involvement of specialized companies so that this initial idea, which any engineer from any university in the world may have, is possible to carry out. From the moment that idea is generated by the engineer, many stages are necessary to reach the implementation of the product by the end user, so an investment from the base is necessary. For this, it is necessary to involve the entire supply chain in order to validate, commercialize and disseminate the product. In this case, the local repair shops also intervene in this chain, since they need to have the basic tools to fix the chairs; companies that can commercialize the product en masse and NGOs that can disseminate this innovative product in the countries where it is most needed. The vocabulary used in explaining these business concepts requires minimal training in this field. This has an enormous relationship with the subject of the Business Organization and Management subject, taught in the second year, in which the basic knowledge about the management of a company, the viability of a product, ways of attracting investors and others business aspects are provided. You also learn to be part of the chain and a valid interlocutor for business.

Obviously, the subject of Technical English of the second year has been fundamental to be able to carry out this analysis individually and in detail, since the vocabulary used in engineering, and in this talk specifically, is far from what is usually used in schools of secondary education or private academies for learning English. This subject has been an essential tool for understanding the video and writing this text. Furthermore, the subject bases the oral part of its contents precisely on the preparation and presentation, by the students, of a presentation on some

technological advance through strategies learned, precisely, in the TED talks. Therefore, the evaluation of the exercise affects not only the aspects that have to do with the command of the English language (pronunciation, expression, fluency), but also with the non-verbal techniques of presentation, such as body language, tone of voice , eye contact, use of slides, and strategies to capture the attention of listeners (rhetorical questions, suspense, introduction of a personal anecdote, among others).

b) Social aspect

The importance of the social aspect of a talk like this, intended in principle to the presentation of a technological advance, appears explicit from the objective set at the beginning of it: to design a product for people with reduced mobility who are in countries on the way to developing. This entails a series of very concrete and non-negotiable constraints, since otherwise it would not be possible to achieve the desired end. The constrictions are as follows:

• An all-terrain wheelchair should be cheap. It has to be made with very cheap materials to be mass-produced by specialized companies, knowing that the sale price must be low.

• It also has to be able to be repaired in local shops with basic tools, so simple components have to be used and can be obtained anywhere in the world. Components such as a gear train or levers are accessible and known in any country, since these elements are very simple and are present in a multitude of applications.

• It is necessary that the product adapts to the conditions of the terrain of the developing countries, where the chair is going to be marketed. Most of the population live in rural areas where uneven terrain such as mud or sand abound. Consequently, the chair must save these lands with solvency and be able to transport people for several kilometers to go to work or school by its own means.

• In addition, the chair must meet certain standards in confined spaces, so it cannot be too large or too heavy. The physical capacities of the

end users are very limited, so the final result is conditioned to a good handling and maneuverability of the same.

It is important to highlight in this analysis that the value of the social part increases when there is a direct relationship between the people in charge of manufacturing the product and the end user. As explained above, there are many factors to consider before and during the manufacture of the product. But obtaining a functional and quality end product is not easy. In the final design stage, the evaluations of the end user are very important, user who is perfectly aware of his limitations and can be very useful when defining those of the machine. For this reason, with the first prototype, the MIT work team had to go back to the design phase, taking into account the interesting contributions, not only from the end users but from the entire supply chain. This led them to see everything from another perspective where the person is the one who moves his arms and decides the whole movement. This led to the obtaining of a chair that has been tried and tested in different conditions and terrain.

c) Expression and communication aspects

Once the talk has been studied in terms of content, this section will delve into the expression and form of both the presentation and its author, taking into account that "an eloquent message is defined by the clarity of the story, the passion with the one that is told and its relevance to the audience "(Endicott, 1999, 28).

1) Parts and characteristics of the talk:

There are several clearly differentiated parts to the presentation. The first is a description of the problem. Winter focuses, at the beginning of the talk, on pointing out the main differences between living with physical disabilities in a developed and a developing country. He highlights the difficulties faced by the population of these latter countries by showing a series of photographs in which the inequality between countries can be observed at a glance. Winter uses personal situations, nothing abstract, using a tone of own experience acquired in his repeated trips to these places. This tone and these references mixed with personal

anecdotes will be a constant during the rest of the talk. It occurs, for example, when projecting photographs in which Winter can be observed with the people with whom he collaborated. It will also happen later, when they had to speak with prototype users and with manufacturing companies, recognizing that he and his team made mistakes many times before coming up with the final solution.

In a second part he explains the previous considerations that must be taken into account before calculating and implementing any solution. He does so by developing a time frame, placing the public in Tanzania in the summer of 2005. He also introduces some personal references such as his specialty (Mechanical Engineering), the university where he works (MIT) and comments on the large amount of resources available to him. to try to solve the problem presented. All this creates in the public a feeling of closeness with the speaker when they know certain details about his personal life and the moment in which the project originated.

The next part focuses on the explanation of the proposed solution. He concentrates this explanation on the use of levers, present in a multitude of mechanisms. It does so in a simple way, emphasizing that the person is really the machine itself and is the one who moves the arms to, through a very simple mechanism, provide mobility to the wheelchair. He explains the keys that he considers have led to the success of this project and the most important characteristics of the manufactured product. He renames the personal references discussed above to later introduce what a mechanical engineer is capable of doing in a position like his. Subsequently, he comments on the previous prototypes manufactured, which did not meet the needs of the user and the importance of obtaining feedback from both end users and the companies in charge of manufacturing the product.

A next stage deals with the analysis and calculations made to the new product in different field tests, observing the speed reached in different types of terrain, the user's oxygen consumption and the efficiency of the chair in different conditions. Through these calculations he is able to demonstrate that the desired objective has been achieved. He also comments that they have planned a more expensive version for the

developed world and highlights the importance that all parts of the supply chain are involved in a project and that everything revolves around the most important thing, the end user.

The end of the talk is marked by a video about a person in India. Ashok fell from a tree and suffered a spinal injury for which he had to quit his job, as he could not travel the kilometer that separated him from it with a conventional wheelchair. Thanks to this lever-powered off-road wheelchair, Ashok was able to reopen his business and bring money home again.

2) Use of slides and visual impact:

Throughout the talk, there is an intentional use of slides that contributes to a greater understanding of the verbal message and generates a great visual impact. In this sense, it can be stated that "visuals become more than just an aid; instead, they are important elements in facilitating ethos and developing a relationship with the audience" (Kedrowicz and Taylor, 2016, 354). In the first example, Winter points out the main differences between developed and developing countries. With this distinction, an incredible polarization between one world and another is obtained, an argument that will be used repeatedly throughout the talk.

He then uses photographs from his trip to Tanzania. With these simple images, he reveals how this idea was conceived and the process that led to the solution. To do this, he uses the image of a mountain bike, thus introducing much more complex terms of his specialty, such as the concept of torque, gears, levers, etc. He does it jointly deliberately, to try to familiarize the audience with this type of vocabulary.

It is noteworthy that, in this part, Winter uses "bullet points" in a transparency, although not overwhelmingly. As discussed before, this type of "list" of important features should be used judiciously so as not to lose the viewer's attention.

Subsequently, very basic and minimalist drawings are shown, causing the audience a feeling of simplicity, as if anyone present in the auditorium could have found the solution. In addition, successive images provide an overview of the tools that are necessary for the manufacture and

repair of the mechanism, being able to verify that they are very simple tools.

Next, a series of mathematical relationships appear on the screen, although they are not commented on, thus preventing the audience from being overwhelmed or losing concentration. These relationships serve to introduce the manufactured prototypes, which were not suitable for this type of land or to be used inside a house. Winter shows how the field tests were carried out, comparing the manufactured wheelchair with a conventional one, showing the great difference between them and crediting it with percentages that appear on the screen to confirm their claims.

At the end of the talk there is an emotional moment with the projection of the video of Ashok in his new wheelchair. Showing this video and doing it at the end of the presentation indicates that you have wanted to give it great importance. It seems logical, because according to the story of this person, the goal for which Winter has fought for years has been achieved, allowing these people in need to move that would be impossible without the help of this new all-terrain wheelchair.

5. CONCLUSIONS

Various conclusions can be drawn from the previous information. Regarding the specific content, the vocabulary used by the speaker is very specific, aimed at an audience that must have a medium level of scientific knowledge about which the presentation is about. In this regard, it has been possible to verify the necessary application of practically all the subjects taken in the Degree in Industrial Electronics and Automatic Engineering for the complete analysis of the talk. Nowadays, an engineer must be able to master all the facets of his area of knowledge, and the sufficient capacity is presupposed to adapt to those that he does not master. In this sense, the TED talk shows to what extent the set of knowledge acquired in the different subjects of the degree can and should be put into operation at the service of effective communication.

In the talk analyzed, the core element is the social aspect that it treasures. A study is proposed or a product is implemented in order to improve

the quality of life of society. This, which must be present in all facets of a professional's life, is something that an engineer should not lose sight of: the why or why of any project, beyond the immediate response from the technical field.

Regarding the expression and the communicative aspects, it can be concluded that the speaker makes his presentation in a personal way, but always framed in the prototype of TED conferences: pleasant talks, with many images and videos with a great visual impact, personal references, closeness to the public, multiple non-verbal aspects that have not had a place here (repetitions, changes in the tone of voice, eye contact, rhetorical questions, humor, body language and many others), great capacity for synthesis and undoubted ability to transmit complex concepts in a language accessible to the average citizen.

Returning, then, to the main objective of the present work as it was stated in the introduction, we have tried not only to verify the need for the Spanish engineer, as well as the Anglo-Saxon, to receive specific training in professional oral communication from the university classrooms but, in addition, the close relationship, already existing, between the necessary tools (the method, the "how" of the transmission of knowledge) and the contents to be transmitted (the subjects of the degree in engineering, the " what "or" crux "of the matter). We believe that the matter should involve all parties in charge of designing the curricula as a whole. One part of the problem, of course, is mastery of English. But another no less important, as we hope to have shown in these pages, is what is known for effective communication, in English, in Spanish and in any language

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