Contribution of Science Popularization in Translation Didactics

مساهمة التبسيط العلمي في تعليمية الترجمة

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Abstract:

The present research paper attempts to demonstrate the main aspects of science popularization as one of the fundamental sciences that have an impact on man's daily life in the last century. Therefore, we aim through this study to shed light on science popularization by representing a detailed definition of its concept and process, illustrating the skills that science popularizer should have, and the role media plays in sharing and communicating scientific knowledge. In addition, science popularization has a strong relationship with translation since they both intend to transfer knowledge to a particular readership. Hence, we try to summarize the major common points between translation and science popularization, as well as the great contribution of this later in facilitating the process of teaching and learning translation by integrating popular science texts in translation didactics process, exploring their characteristics in improving student's translational skills, and enriching their background in scientific subjects.

Keywords: Science Popularization; Translation Didactics; Popular Science Texts; Reformulation Skills; Scientific Knowledge.

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ملخص:

تحاول هذه الورقة البحثية إظهار الجوانب الرئيسية للتبسيط العلمي بوصفه أحد العلوم الأساسية التي لها تأثير على حياة الإنسان اليومية خلال القرن الماضي. لذلك، تهدف هذه الدراسة إلى تسليط الضوء على التبسيط العلمي من خلال تقديم تعريف لمفهومه ومنهجه، بتوضيح المهارات والكفاءات التي ينبغي أن تتوفر في مبسط العلوم، والدور الذي تؤديه وسائل الإعلام في نشر المعرفة العلمية وتوصيلها. إضافة إلى ذلك، فإن التبسيط العلمي له علاقة وطيدة بالترجمة لأن كلاهما يستهدف نقل المعرفة إلى قراء معينين. ومن ثم، تستخلص هذه الدراسة النقاط المشتركة الرئيسية بين الترجمة والتبسيط العلمي، فضلاً عن المساهمة الكبيرة لهذا الأخير في تسهيل عملية التدريس وتعلم الترجمة من خلال إدراج نصوص التبسيط العلمي في مسار تعليمية الترجمة، واستكشاف خصائصها لتحسين تكوين الطالب وتنمية مهاراته الترجمية وإثراء محموله المعرفي في المواد العلمية.

الكلمات المفاتيح: تبسيط علمي؛ تعليمية الترجمة؛ نصوص علمية شعبية؛ مهارات إعادة الصياغة؛ معرفة علمية.

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1- Introduction:

Nowadays, the world is witnessing a quick development in scientific discoveries, and a large use of technology in most domains of life. Yet, these high-leveled fields of sciences are regarded as dark ambiguous roads that people will never take, because they find difficulties in understanding specialized scientific language.

Due to the direct impact of the ever-increasing scientific discoveries on man's daily life, science popularization is becoming one of the fundamental sciences, proceeding aside with the advancement of scientific and technological fields as the key to overcome fears of science, in order to allow all ranges of society to get access to science, and make it wide opened to the whole world.

Hence, we aim to demonstrate the importance of science popularization in all stage of our lives, and its role in teaching translation as a first step to transfer knowledge, answering the following questions:

- What is science popularization, and who is the responsible of this process?

- How can media accelerate the distribution of popularized science throughout the world?

- What is the role of science popularization in teaching translation? and what are the most convenient approaches to translate popular science texts?

2- What is science popularization?

The simplest way to realize what science popularization means is to look at the words themselves: science and popularization. According to Oxford Dictionary, the word ***science*** refers to the study of science which is the "knowledge about the structure and behavior of the natural and physical world, based on facts that you can prove, for example by experiments" (Oxford, 2017). Same dictionary defines the word ***popularization*** as "the act of making a difficult subject easier to understand for ordinary people" (Oxford, 2017).

Synoptically, its function consists in clarifying the difficult terms and the ambiguous concepts, and explaining scientific knowledge in a simple comprehensible way, in order to enlighten the general people and render the scientific facts available for everyone. More than this, science popularization is a communicative process that links two ranges of the society: specialist scientists and general public, as Paola Catapano says: "Science popularization is the tool to bridge the growing gap between society at large and the world of science" (Catapano, 2016).

3. Science popularizer:

There are many conflicting opinions about the persons in charge of popularizing science. For Eduardo Martinez , "The popularization of science should be taken care of by scientists, communicators, educators, artists; by those who know the scientific content of the message, and those who know how to make its transmission and learning more efficient" (Martinez, 2016). In some cases, even journalists and translators do popularize science.

We can simply consider science popularization as a translation of a scientific text from a specialized language (source language) into a simple language (target language), but this common idea conceals the reality of this valuable complicated process, because transferring knowledge with degradation from the high range of scientists to a lower range of general public is not that simple; it is a complicated process with different dimensions which requires a particular skills, a high level of scientific knowledge, and a proficiency in both scientific language and style, the reason why we believe that the most qualified person for science

popularization is the scientist, because he knows best what science in essence is, and masters better the field that the text belongs to.

4. Skills and qualities of science popularizer:

As we previously mentioned that science popularization is not a simple activity, science popularizer should have some fundamental skills such as mastering both scientific language and style, having a high level of scientific knowledge and a real desire to practice this activity, being a communicative person, gaining people's attention and confidence to share science with others. Besides, science popularizer is obliged to master computer tools since this activity is a matter of media and invention.

Moreover, having all these skills is not enough to achieve the science popularization's goal, that's why science popularizer is ought to draw up a strategy with effective steps, as following:

4.1 Defining the target audience:

First of all, defining the target range is the key to succeed a good transmission of scientific knowledge; it helps the science popularizer to choose the most suitable discourse for the target audience according to their educational and mental level, and the category they belong to (children, teenagers, specialists and non-specialists, general public…).

4.2 Choosing communicative channels:

There are many ways to popularize and share science such as: written articles, books, magazines, lectures, shows, videos, radio, podcast, social media… etc. As a consequence of these many choices, the science popularizer may be confused about making his mind about the best choice; so he should pick out the most suitable communicative channel according to the target audience, and the efficiency of the channel itself in transmitting effectively the information as fast as possible.

4.3 Making a spark:

One of the tricks to attract people's attention even before getting into the subject details is making the article or the show more attractive by setting off a weird fact, an inspiring idea, or a perplexing question.

4.4 Giving real examples:

In order to make the activity of science popularization more effective, the science popularizer should be clever in exploring people's

logic about the reality of science, and attracting their attention by telling example and stories from real life. This brilliant idea that consists in linking facts from daily life with the world of science helps the audience enjoying the popularized document (paper or show), and looking forward to get more information.

4.5 Being simple:

Since science popularization is all about simplifying science, the science popularizer has to avoid academic details, using common terms in a simple style, instead of scientific complicated terms.

4.6 Trying to be neutral:

Science is obviously known by its clarity, concision, and exactitude. Personal and ideological opinions never make a difference when dealing with exact experiences and clear results, that's why the science popularizer should be neutral as much as possible in presenting scientific facts and evidences.

4.7 Being funny:

It's definitely uninteresting when the science popularizer simply reads a text in a boring way. He should instead create interaction with the audience, and animate the show in such an energetic exciting way, trying to be funny and entertaining.

4.8 Keeping on practicing:

The science popularizer is always in need for practice and training to improve his skills in popularizing science, mastering computer and media tools, and animating enjoyable and effective shows. (Lotfy, 2017)

5. The importance of science popularization:

Recently, science popularization became the case of the world; it has been rapidly over-spread and invaded almost all the fields due to the important role it plays in enlightening people about what is going on in this universe. Whereas, some people are usually not interested in science because they consider it as a very complicated issue; they have fears to tackle any scientific subject, which leads gradually to scientific literacy.

In the last few years, many conferences about science popularization took place whether in the international or the Arabic world, they aim to shed light on science popularization and strengthen its great role in sharing and

communicating science with all categories of society, in order to render every human individual scientifically cultivated.

During the world conference on science popularization entitled: *A New Commitment, Communicating and Popularizing Science. The communication of scientific knowledge in society: The role of the media*, professors and scientists had discussed the objectives of science popularization, they believe that there are many reasons for popularizing and communicating science, one of them is that " scientific knowledge is of use for everyone " (UNESCO, 2016) because our daily life is contesting a high level of scientific and technological advancement.

Furthermore, man is surrounded by a huge number of technological devices, facing many scientific events and phenomena, and susceptible to many kinds of diseases. For this reason, each man must be informed _with comprehensible simple words_ about how to deal with such cases, how to use at least the most essential devices, and how to realize the meaning of a medical advice or report. The only way to reach this level of scientific culture is by popularizing science.

Otherwise, the second reason for popularizing science according to the same conference participants is that "scientific knowledge may alter the world. Our daily life is influenced to a high degree by scientific knowledge. Societies have to decide on those issues (e.g. nuclear power or genetic engineering) and therefore people have to be informed about that kind of science. They should know how to vote on the development of these technologies" (UNESCO, 2016) .

In addition to these two fundamental reasons, we conclude other important aims of science popularization as following:

- Simplifying science for non-specialist audience to overcome science phobia.
- Reaching a high level of cultural science.
- Ensuring a comfortable life to all individuals.
- Making scientific discoveries available for everyone, and guarantee their right in voting on crucial issues.

- Representing different fields of science and technology to the youth and children, in order to help them choosing their future studies and careers.

- Enriching the national language (Arabic language in our case) by translating popular science texts.

Hence, regarding that the scientific writings in Arabic are very few comparing to those in other languages, reaching the scientific knowledge for the Arabic reader is pretty difficult and challenging. In this case, he has to choose one way of these two: weather to read these scientific writings in their original language, giving up on his mother language, or to translate them into his mother language in case he is clinging to his mother language. This procedure stimulates the evolution of the Arabic language to be more acceptable for new discoveries (شوشاني عبيدي، 2018) .

5.1 The role of the media in promoting and sharing science:

As we previously mentioned, science popularization is making science widely exposed to non-experts, it is "a process of communicating and appropriating scientific and technological knowledge aimed at broad sectors of the population. It is similar to a pyramid which rests on four components:

- Science and technology interactive centres;
- Multimedia programmes for science and technology popularization;
- Mass media and the dissemination of science and technology; and
- Formal education/science learning." (Martinez, 2016)

Due to the ever-increasing number of scientific and technological discoveries, the mission of making science immediately available for everyone is getting harder, whether popularizers are scientists, journalists, or translators, because they have to be as quick as a flash in popularizing and sharing science, in order to keep pace with the rhythm of scientific advancement. This stressing difficult mission can't be fulfilled by using ordinary tools and communicative channels (books for example), it requires a more developed equipments that facilitate this process: "In all these areas of popularizing and communicating of scientific knowledge media have to

play an important role. Where scientific knowledge is of use for everyone media have to distribute that knowledge. That's the service-function media often have to play. Where science may provide a new insight in how the world is functioning media should disseminate these discoveries in special sections or magazines" (UNESCO, 2016).

For this reason, we believe that media tools are the most effective channels for distributing scientific information throughout the world at the right time, since people are all the time on social networks (Facebook, Twitter, YouTube…etc), in addition to the TV sets that are of use for everyone, especially documentary channels.

6. Science popularization as a translation:

Science popularization and translation has been always taking the same path for the aim of wide spreading knowledge. Bouznad goes even further in the idea of the strong relationship between science popularization and translation, claiming that "if dissemination of science in different languages throughout the world is a human duty, then translation is undoubtedly a main condition for that" (بوزناد، 2018)

In many situations, science popularization was considered as one of translation forms due to the obvious similarities in their process, goals, obstacle… etc. In order to clarify this idea, we try to make a closer look at their common points.

On the part of science popularization, this activity aims to reformulate scientific concepts in such a simple and clear style which is comprehensible for general public, of course after grasping the whole sense of a text:

> "La vulgarisation scientifique est une reformulation par un chercheur ou un enseignant scientifique lui-même, ou par un journaliste dit scientifique" (Loffler-Laurian, 1985)
>
> «i.e. Scientific popularization is reformulation made by a researcher, a scientific teacher himself, or a so-called scientific journalist".

On the other hand, according to Interpretative Theory, the act of translating consists in understanding a text, then re-express its meaning in another language:

> " La traduction est une seconde reformulation par rapport à un original. En ce sens, elle fonctionne de façon similaire à la

vulgarisation. Dans un cas comme dans l'autre, l'objectif est de permettre à un public plus vaste d'avoir accès à l'information scientifique" (Loffler-Laurian, 1985)

"i.e. Translation is a second reformulation of an original: it has a similar performance as popularization. In either case, the goal is to allow the target public to reach scientific information".

In a view of all these similarities, we try to illustrate the most common points between science popularization and translation _through interpretative theory_ in the following table:

Table 1. ***Similarities between science popularization and translation***

	Translation	**Science popularization**
Object	Discourse/text from different fields (written, spoken, video...)	Scientific discourse/text from different fields (written, live shows, video...)
Language	From language A (ambiguous) to language B (comprehensible)	From specialized language to common language
Purpose	Share/ transfer a message	Share/ transfer knowledge
Process	- Analysis - Understanding - Reformulation	-Analysis -Understanding -Reformulation with simpler style/words
Target audience	Other language speakers	-Other fields specialists -General public -Kids and youth
Obstacles	Specialized terminology	Scientific/technical terminology
Practitioner	-Translators -Specialists with linguistic skills -Others (journalists, podcasters)	-Science popularizers -Scientists -Translators with scientific knowledge -Others (journalists, podcasters)

7. The role of the popularized text in teaching translation:

The journey of translation teaching has always been quite long, stepping from a theory to another, from an approach to another, and following many different methods. It is almost impossible to be restricted with only one method due to several changing factors such as: the students

educational and cleverness level, their cultural background, teaching conditions, the field of the study (science, literature, politics..), the style and the personality of the teacher himself, and the goal of this teaching process.

Generally, a teaching method is the path that teacher should keep to in order to achieve his goal. In other words, it's the way used to make students understand a lesson, and the plan we draw up before getting in the classroom (اليتيم، 2015). Thus, every teacher should create himself a suitable teaching strategy, taking into consideration the factors we stated above.

Translation didactics is a sharing reciprocal process in which both teacher and student make their efforts and show their collaboration. Teacher is the leader and the arranger of this process, he is charged with a serious mission beginning with defining pedagogical goals which lead to adapt the most suitable teaching method according to the students educational level and their prerequisites.

Esteeming, as Christine Durieux claims, that teaching translation is a communicative process between the teacher and the student that aims to transfer a skill (Durieux, 2010), the teacher is asked to explore his intelligence when selecting the educational tool that leads to achieve the expected goals and helps the students to acquire the necessary skills in order to fulfill a good translation. In this case, Kohil believes that the text is merely the only available educational tool from which the teacher derives exercises and applies techniques (كحيل، 2009).

Moreover, the types and subjects of the texts offered to the learners have a strong relationship with the training goals and effectiveness; they are supposed to interest the learners and contribute to the acquisition of several skills. According to Durieux, the initial step to a successful teaching method is to pick out carefully the texts on which student will practice and learn translation. For her, the perfect process certainly is to increasingly achieve a difficulty in the working texts.. With regard to this, three axes are shown up: a difficulty of writing, a difficulty of documentary and terminological research, and integration of several techniques in the same text (Durieux, 2010).

7.1 Employing science popularization texts characteristics in teaching translation:

What distinguishes science popularization texts from other types of texts is the fact that they are easily understandable, almost devoid of

specialized terms, and don't require an in-depth documentary and terminological research when translating. Actually, the set of concepts and equivalents provided by documentary and terminological research from different resources are regarded as a stumbling block for translation trainee, considering the difficulties he finds when trying to select the most convenient term or concept, given that he doesn't have the right vision to evaluate the available options and solution, or to put into use the alternative strategies (ألبير، 2009) . For this reason, science popularization texts are strongly recommended to practice translation especially at the very early stages of teaching-learning translation.

Furthermore, although science popularization texts are easy to be understood, their style is considered as a major hindrance in the translation process, given that this type of texts is not, necessarily, difficult to understood technically, whereas it requires particular efforts in the reformulation phase (Durieux, 2010). In this case, we find that translating science popularization texts deals with the most common mistake that student makes, which is rushing to reformulate the text in the target language. For this reason, Durieux stresses that the trainee translator must be placed at the heart of the translation process, giving him all the details of the followed strategy steps, in order to help him realize the mechanism that controls the process. Besides, recognizing that re-expressing a meaning is the essence of the translation process which leads definately to produce a good faithfull translation, as Durieux also points out that reformulation is not only a linguistic game, it is a real translation (Durieux, 2010), we believe that inciting the trainee translator to practice frequently on science popularization texts improves his writing style and sharpen his reformulation skills, exploring the stylistic and syntactic characteristics of this type of texts.

Moreover, as the nature of the translational process requires to have a strong memory, positives of translating science popularization texts are not limited to sharpen the trainee reformulation skills only, they actually help him to refresh and reactivate his memory particularly at the reformulation phase, by recalling spontaneously the cognitive components already stocked in his memory. For this reason, Delisle points out the importance of the translator's memory saying that reformulation is basically founded on the linguistic memory (Delisle, 2003), since it is considered as a cognitive background storage which translator always call first to restore the appropriate indeed term or concept.

8. Approaches to translate science popularization text as an informative communicative text:

In the vast world of translation, translators meet a numerous varieties of texts, according to their types, their aims, or the fields they belong to. Therefore, many theories and approaches had been existed through the history of translation, depending on the several characteristics of texts we mentioned above. Yet, the problem we face here is to decide which approach is the most convenient to apply when translating a science popularization text?

In order to answer this question, the first step that the translator should take is to define the type of the text, which is_ for Reiss_ the factor that leads to determine its function and its goal, then the suitable method to translate it. (شاهين، 1998)

8.1 As an informative text:

To define the popularized text's type through Reiss's model that distinguishes three types of texts according to their function: informative, expressive, and operative (شاهين، 1998), we are definitely regarding the popularized text as an **informative** one, since his role consists in transferring knowledge and offering information, as Newmark stated: "For the purposes of translation, typically 'informative' texts are concerned with any topic of knowledge" (Newmark, 2008. P40)

On the other hand, looking at goal of the informative text generally, and the science popularization text particularly, we realize that the aim of translating science popularization texts is to make knowledge wide-exposed and available for everyone, which is typically the concept of the Skopos theory. Furthermore, Vermeer "refers to the source text as an offer of information which is then turned, either wholly or partly, into an offer of information for the target audience" (Vermeer, 1982) cited in (Byrne, 2006.P40). He believes that the function and the value of the target text must be the same as the source, which is exactly our case, considering the target text as the translated one, and the source text as the popularized one (in reference to an original scientific/specialized text).

There is a link between Skopos theory and the functionalist approach in translating a science popularization text: they both persist in making knowledge accessible to the target audience, or it cannot be considered as a

successful translation, then, the science popularization text loses consequently its aim and value through translation.

The application of this approach when translating a science popularization text is quite clear and logic, since it is based on transferring as much as possible the meaning of the source text (science popularization text in this case), respecting as well its structure, by keeping on the balance between sense and form equivalence.

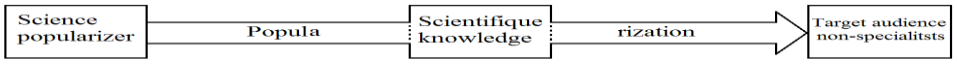
7.1.2 As a communicative text:

At the outset of this paper, we have mentioned that science popularization is not only transferring information, it is actually an act of communicating knowledge with a particular audience, as Daniel Raichvarg maintains:

> "La vulgarisation des sciences, qui était machine à transmettre des savoirs, s'est transformée en un fait social et communicationnel total" (Raichvarg, 2010)
>
> "i.e. Science popularization which was a tool to transmit knowledge, is becoming a totally social and communicative act".

Moreover, the science popularization text is an informative text intended for a particular audience, which means that there is a communicative process consists on transmitting a message (the content of a popularized text) from a sender (science popularizer), to a receiver (target audience) through a channel (science popularization), explained in the schema below :

Table 2. ***Science popularization as a communicative process***



Since the basis of science popularization is sharing and communicating knowledge, the translation of this type of texts must be done in a way that respects the communicative characteristics of the popularized text.

According to Reiss ,"the ideal translation is one where optimum equivalence is achieved as regards the conceptual content, linguistic form, and communicative function" (Reiss, 1971) cited in (Byrne,2006.P31). Thus, translators are ought to take into consideration the communicative situation, and ensure, as much as possible, a good transmission of a meaningful message when translating a science popularization text.

From a pedagogical point of view, if the teacher had already given to his students enough information about the most famous theories of translation, the most effective approaches, the characteristics of a science popularization text, and especially the aim of translating a given text, they will automatically recognize the situation they are facing, and realize easily the convenient approach to this situation, as Nord claims: "the translation purpose justifies the translation procedures" (Nord, 1997) cited in (Byrne, 2006.P45)

8. Conclusion:

Science popularization aims to explain, simplify and clarify complicated scientific knowledge, then share interesting facts with a given audience. At the early stages of the pedagogical process, specialized texts, particularly scientific and technical ones, are difficult to be translated. Therefore integrating science popularization texts as training texts in teaching translation is very useful and beneficial, believing that they are the most suitable types of texts for beginners for the reason that they are easy to be understood, free of style complications or terminological obstacles, and they are telling about common subjects that don't require deep research. Besides, when translating science popularization texts, students are developing automatically their scientific cultural level, and improving their translation and reformulation skills. Simply, the science popularization text is the perfect piece of work for translation learners.

References:

Byrne, J. (2006). *Technical translation: Usability strategies for translating technical documentation.* Dordrecht,Netherlands: Springer.

Catapano, P. (2016, 05 11). *World conference on Science: The communication of scientific knowledge in society,The role of the media* . Retrieved from: http://www.unesco.org/science/wcs/abstracts/II_11_communicating.htm

Delisle, J. (2003). *La traduction raisonnée: manuel d'initiation à la traduction professionnelle de l'Anglais vers le Français.* Ottawa: les presses de l'Université d'Ottawa.

Durieux, C. (2010). *Fondement Didactique de La Traduction Technique.* Paris,France: Maison du dictionnaire.

Loffler-Laurian, A.-M. (1985). Vulagarisation Scientifique: formulation, reformulation, traduction. *Langue Française, Français technique et scientifique : reformulation, enseignement* , pp. 109-125.

Lotfy, S. (2017, 02 28). *10 قواعد رئيسية تساعدك في تبسيط العلوم.* Retrieved from sasa post:

http://www.sasapost.com/tips-for-science-communication

Martinez, E. (2016, 05 11). *Boosting public understanding of science and technology in developing countries:Regional specialist, science and technology management. Unesco office, Montevideo, Uruguay.* Retrieved from: http://www.nature.com/wcs/c16.html

Newmark, P. (2008). *A Textbook of Translation.* Edinburgh Gate, Harlow, England: Pearson Education Limited.

Nord, C. (1997). *Translating as a Purposeful Activity.* Manchester: St. Jerome Publishing.

Oxford. (2017, 02 11). *Oxford.* Retrieved from: http://www.oxfordlearnersdictionaries.com/definition/english/science?q=science

Raichvarg, D. (2010). La vulgarisation des sciences: fausse traduction et vrai interprétation. *Hermès, La revue* , pp. 105-112.

Reiss, k. (1971). *Möglichkeiten und Grenzen der Übersetzungskritik. Kategorien.* Munich: Hueber.

Unesco. (2016, 05 11). *world conference on science*. Retrieved from: http://www.unesco.org/science/wcs/abstracts/II_11_communicating.htm>

Vermeer, H. (1982). Translation als Informationsangebot. *Lebende Sprachen* , pp. 97-101.

ألبير, أ .أ. (2009). *الترجمة ونظرياتها.* ع .ا .المنوفي (.Trad) ,القاهرة :المركز القومي للترجمة.

اليتيم, س .ش. (2015). *طرائق واستراتيجيات تدريس العلوم في ضوء الرؤيا البنائية* . عمان، الأردن :دار عالم الثقافة.

بوزناد، هاجر. (2018). *التبسيط العلمي: بين صعوبات الترجمة وإشكالات التلقي*. المترجم ، 18 (1)، 159-185

شاهين ,م .(1998) .*نظريات الترجمة وتطبيقاتها في تدريس الترجمة من العربية إلى الانجليزية وبالعكس* .عمان،الأردن : مكتبة دار الثقافة للنشر والتوزيع.

شوشاني عبيدي، محمد. (2018). *ترجمة النصوص العلمية المبسطة الموجهة للطفل*. المترجم ، 18 (1)، 187-199.

كحيل ,س .(2009) .*تعليمية الترجمة :دراسة تحليلية تطبيقية* .إربد الأردن :عالم الكتب الحديث.