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DEPARTAMENT DE FILOLOGIA ANGLESA I DE GERMANÍSTICA

Data-Driven Learning: Feasibility for Young Learners in the Context of ESO

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Abstract

Data-Driven Learning (DDL) refers to a language approach where the learner is exposed to authentic material from corpus linguistics – the study of collections of real texts which are characteristic and important for a language stored in an electronic database. There is good evidence to prove that DDL has been successfully applied in university levels but this research questions whether this aforementioned methodology would be feasible in ESO context. This study not only highlights DDL success among university students but it also raises awareness about its problems and limitations. Taking the weaknesses into consideration, a detailed guide about how to adapt DDL to ESO context is offered. One of the main obstacles found is that the methodologies for introducing DDL into classrooms have not changed much and are inappropriate for secondary school students. A solution to this would be blending DDL with an already existing and widespread methodology, in this case TBLT. There are good reasons to see the potentials of this methodology applied to secondary education but there are some limitations. The results of this study conclude that in order to conclude with certainty that DDL would be feasible in the ESO context further empirical research has to be done.

Keywords: Data-Driven Learning, inductive learning, authentic material, corpus linguistics, TBLT, ESO.

1. Introduction:

Data-driven learning (DDL) is a language learning approach that is linked to corpus linguistics which brings authentic material to the learner in order to be used, transferred and applied to many linguistic skills and in many different ways. Corpus linguistics refers to the study of collections of real texts that are characteristic of a language or domain, stored in an electronic database. The term 'data-driven learning' was first introduced by Tim Johns (1991) in order to define how students could explore language on their own. By learning inductively and giving the learner the opportunity to work as "language detectives" (Crosthwaite 2019: 3), bringing students to the centre of attention when learning how language works. Moreover, it is claimed that the fact the learner is exposed to texts relevant to their needs, makes the learning process more effective (Cobb, 1999). According to Boulton, dealing with authentic texts in different genres and inferring meaning is something that DDL provides students in order to become better language users (Boulton 2017: 182). DDL not only works because it has been proved to have a number of cognitive benefits, but also represents the world we live in; the digital age. Due to this, learners can find information on any topic they wish just "at the touch of a button". (Crosthwaite 2019: 3). Over the last decades, several studies have been carried out testing the effectiveness and limitations of data-driven learning (DDL). These studies have largely focused on university levels and tertiary education students, leaving out younger students who may also benefit from DDL.

The main aim of the research is to demonstrate it's the feasibility of DDL in an ESO (secondary education) context. The present study will include an introduction to data-driven learning as well as its origins and background in order to become familiar with the topic. Furthermore, a review of several previous studies carried out among university and tertiary education learners, revealing its positive and negative outcomes, will be provided. Once all these parts are covered, a section will be devoted to the adaptation of DDL to ESO students, providing some steps that should be followed for its successful implementation and discussing opportunities and obstacles this implies. In this last section, my own experience as an ESO teacher, will be used

in order to provide evidence of such potential successes and limitations of DDL. This approach is in line with common practice in the Action Research methodology:

AR (Action Research) is part of a broad movement that has been going on in education generally for some time. It is related to the ideas of 'reflective practice' and 'the teacher as researcher'. AR involves taking a self-reflective, critical, and systematic approach to exploring your own teaching contexts. [...] So, in AR, a teacher becomes an 'investigator' or 'explorer' of his or her personal teaching context, while at the same time being one of the participants in it. (Burns 2010: 1).

2. Previous research of DDL at university level

2.1 Background and general outcomes

Several studies have been carried out among University students testing DDL effectiveness and limitations. There is good experimental evidence for the effectiveness of DDL; Boulton and Cobb (2017) in a meta-analysis of 64 studies testing DDL effectiveness, the majority of them carried out at universities, found large effects in both controlled and experimental group studies ($d=0.95$) and in pre- and post-test studies ($d=1.50$).

Many explanations have been put forward to explain the effectiveness of DDL in the university context. What comes with age is responsibility and capability of working autonomously. This DDL method gives the student independence in language learning, "this boils down to the learner's abilities to find answers to their questions by using software to access large collections of authentic texts relevant to their needs, as opposed to asking teachers or consulting ready-made reference materials" (Boulton 2017: 181). Furthermore, such students have to be in control and aware of how language functions, something that those studying at university should be familiar with.

The fact that learners have the opportunity to work as kind of language detectives also raises the question about what role should teachers adopt when dealing with this particular method. Some experts suggest that the teacher should take the role of guide or "facilitator of language" (Warren 2016: 339) and stop being the only ruling force in the classroom in order to allow students to also

take part in the learning process. Even though we may think it is easy to introduce new methodologies in a classroom, Johns (1991) argues that sometimes teachers do not accept changes easily since many traditional aspects of teaching start to fall into pieces such as the syllabus and the teacher's key from the activities. Therefore, what seems the most appropriate option is to establish a balance between technology and human-based teaching, something that would be the perfect combination in order for DDL to succeed.

DDL can be either teacher-directed or learner-led (...) to suit the needs of learners at different levels, but it is basically learner-centred (...) the key to successful DDL, even if it is student-centred, is the appropriate level of teacher guidance or pedagogical mediation depending on the learners' age, experience and proficiency level, because "a corpus is not a simple object, and it is just as easy to derive non sensical conclusions from the evidence as insightful ones" (Sinclair 2004: 2).

Students also have to adopt a new role as language researchers if the aforementioned approach is meant to work. The fact that learners have to deal with a great deal of authentic information, also teaches them how to be selective and narrow down the scope when looking for information. It has been claimed that DDL is an inductive approach, taking students to focus-on-form and integrating some constructivist features: "constructivist learning theory predicts that knowledge encoded from data by learners themselves will be more flexible, transferable, and useful than knowledge encoded for them by experts (...) and transmitted to them by an instructor" (Cobb 1999: 15). Focus-on-form refers to an approach which makes the learner raise awareness of the grammatical form and features of a language. What has been claimed over the years is that by using inductive learning approaches, learners are more capable of retaining information since they have generated rules and generalisations themselves. However, Tsai (2019) claims that some aspects of language, such as vocabulary, are better acquired when using deductive approach rather than only learning inductively. However, in the same article, some areas in which inductive approach plays an important role are highlighted. These areas cover the use of collocations, colligations and lexicon-grammar patterns (pp.808-809).

DDL has proved to be successful as language learning methodology among university students in several respects. First of all, learners benefit from being language researchers and

language learners as well as developing skills which include critical thinking, problem solving and analytical reasoning. (Warren 2016: 341). Apart from this evidence, Crosthwaite (2019) mentions other areas which of DDL effectiveness has been proved such as: vocabulary learning, error correction, phraseology, disciplinary-specific register and lexis, translation and interpreting among others (pp. 4). The fact that we now live in contact with technology, also makes it appealing and easier to engage the audience willing to learn a language in a new and more effective way. It is worth mentioning that learners are already using technology and the Internet in their daily life, making them feel closer and adapting easier to DDL. Apart from the aforementioned advantages, cognitive benefits should also be taken into account when considering DDL.

2.2 Problems and limitations

Having seen its advantages and covered the areas in which DDL has proved to be successful, we may be wondering why this is not a mainstream practice: there are also problems and limitations. Technology has made our lives easier in the recent years. Nevertheless, technical problems and logistics of using it sometimes can be counterproductive. This is exactly what happens with DDL. First of all, every learner has to have software and Internet access in order to use corpora. We may think that is not a major problem but many students and teachers cannot afford this access since it requires computer and specific linguistic software access in order to get the full experience in DDL. Apart from that, some claim that these corpus websites are not easy to use if training has not been provided whether for teachers or students. Even though it is argued that these software engines have become more user-friendly recently, difficulties arise when the learner is not familiar with the website itself. This unfamiliarity, “may go some way towards countering objections of technical difficulties, and further training in their use is more likely to be taken up long term precisely because the tools are so general purpose” (Boulton 2017: 188). Thus, technical problems when dealing with DDL are largely found and a big obstacle to obtaining a satisfactory experience on using this method.

The fact that learners have the opportunity to work as kind of language detectives also raises the question about what role should teachers adopt when dealing with this particular method. Some experts suggest that the teacher should take the role of guide or “facilitator of language” (Warren 2016: 339) and stop being the only ruling force in the classroom in order to allow students to also take part in the learning process. Even though we may think it is easy to introduce new methodologies in a classroom, Johns (1991) argues that sometimes teachers do not accept changes easily since many traditional aspects of teaching start to fall into pieces such as the syllabus and the teacher’s answer key for the activities. Therefore, it seems that the most appropriate option is to establish a balance between technology and human-based teaching, something that would be the perfect combination in order for DDL to succeed.

DDL can be either teacher-directed or learner-led (...) to suit the needs of learners at different levels, but it is basically learner-centred (...) the key to successful DDL, even if it is student-centred, is the appropriate level of teacher guidance or pedagogical mediation depending on the learners’ age, experience and proficiency level, because “a corpus is not a simple object, and it is just as easy to derive non sensical conclusions from the evidence as insightful ones” (Sinclair 2004: 2).

The massive amount of information and the way students have to deal with it is also worth mentioning. Neither too little nor too much information is good when doing research. There are a large number of corpus websites which students can easily access but they might not be very familiar with. Furthermore, they need to be very sure about what are they looking for and which aspects of language are they willing to analyse in order to this information be meaningful for them. The massive amount of information that is actually available in corpus linguistics may not fulfil the students’ needs or the content may not be useful. As a consequence, students find themselves overloaded and unable to process all the information found. This also leads to the lack of integration of the found information into real practice, making the full process time consuming and somehow, useless. Some researchers also point out that “existing corpora may not represent all languages in use” (Warren 2016: 342) since language is constantly changing, no corpora could contain all possible words and patterns in a language.

Another difficulty that is found when using DDL is the interpretation of the obtained results. Once the student has gathered all the information needed, interpreting and analysing the results can be challenging without previous training. This aforementioned data analysis goes from counting frequencies of occurrence to calculating out percentage distributions as well as classifying this into word classes (Warren 2016: 342). To get the most out of using DDL as a learning tool, students should be taught how to integrate these queries in corpora websites. Once this knowledge is acquired, they should be able to integrate what they have found and directly integrate it to their language skills such as writing proficiency, error correction, vocabulary use and collocations, among others.

3. Adaptation of DDL to ESO context

Over the years some technological changes have been implemented to make DDL easier and more intuitive to use. However, if we analyse the methodology used to employ DDL, we can see that it has not changed much since its discovery. The way of learning is constantly changing and perhaps, a change in the methodology of DDL employment would be a great solution to integrate it into high school classrooms. This section will provide possible ways to incorporate DDL into ESO context, providing the reader with some potential steps to follow as well as its combination with an already existing methodology. The author's experience as a former ESO student as well as ESO teaching assistant has been taken into account in some arguments about how DDL should be adapted in ESO. Apart from that, having taught in ESO institutions, the author's knowledge of how the internal system works is also useful to develop such arguments.

3.1 Steps to be followed to adapt DDL to ESO

When talking about secondary education, little research has been done in order to prove if DDL is a viable pedagogical approach whereas it is already well established in tertiary education and university context. In order to adapt this particular method and to overcome the problems

encountered when examining DDL in previous research, some steps could be followed. These so-called stages, are divided into major areas such as technological issues, difficulties in looking for information and interpreting results and teacher roles. Something that we have also to take into account is the type of learner we want to address. ESO students are aged between 12 and 16, a difficult age when it comes to maturity and independence. However, it is a crucial age to start becoming autonomous. Among other reasons, DDL can be also a tool not only to teach language but also to teach other study skills such as how to work independently.

When it comes to technical and software problems, one of the main limitations is that either the education centre does not have an infrastructure for corpora or that the corpora websites are too difficult to use. In Crosthwaite (2019), some stages are suggested in order to integrate corpus technology. First of all, high schools should have a good ICT structure, something that in the overall teaching centres is already well established. However, this depends on each school's budget for infrastructure improvement. When this is accomplished, teachers should make a good use of technology and integrate it into the learning process as well as introducing innovative methodologies. In doing so, the teachers are already making the corpora websites more reachable to students who may feel a bit lost when using them. Even though we introduce these aforementioned changes, there is still one big hurdle to overcome: the difficulties in using corpora websites. In order to overcome this, website and corpora designers should make them more appealing to younger learners who may not be familiar with all the concepts and tools they contain. A way to do it could be simplifying the existing traditional corpus platforms, use color-coding or even integrate them in already existing websites. Meunier (2019) highlights some websites mentioned that may serve as DDL tools such as "Playphrasme or LyricsTraining" (Meunier 2019: 6). Thus, by making the websites user or teen-friendly and using them into real classroom contexts, DDL would not be this left over the school curriculum.

Furthermore, it is important that the learners have access to authentic material but it is more important for them to understand it. Even though we think that students know everything about

technology, the truth behind it is that they “lack skills in information retrieval and query refinement” (Gatto 2019: 8). Apart from that, once they have found what they were looking for, the adaptation of it into their language learning is challenging. To solve this problem, we should give texts to students which they are familiar with and that are relevant to their needs. This means to control and guide their information query and give some advice in how to integrate it into their language skills.

As outlined before, teachers play an important role when introducing DDL to classrooms and to integrate it into the already existing pedagogies. One of the major reasons that DDL is not being widely used in secondary education is “due to a lack of knowledge or lack of training for pre- or in-service teachers in understanding and using corpora on their own (...) having developed any interest or proficiency in DDL materials or lesson preparation” (Crosthwaite 2019: 5). DDL has proved to have a good cognitive impact in the students’ learning process (Cobb, 1999). However, there is little knowledge of this among teachers. Therefore, a way of raising awareness among this group is to persuade and show them DDL potential benefits not only in their students learning process but also in their own professional development. Furthermore, the majority of high school subjects are teacher-centred,, which means that the teacher is the facilitator of information and in the same way, the learning process is explicit. It is true though that some new methodologies are being introduced to give more value to inductive learning, something that DDL clearly provides.

A feasible solution to all this is to provide teachers with training in order to become proficient in corpus consultation and material preparation. When they reach such proficiency, it is only then when they can transfer this knowledge to their students and to introduce new methodologies. Warren (2016: 339) suggests that teachers should drop the leading role and students must “take on the role of language researcher”. Rather than leaving students to be a language detectives on their own, this approach could be blended with an already existing methodology. The following section will analyse this statement in further detail. To conclude, with the right tools to

integrate it and with good guidance from teachers, DDL could be as successful in ESO context as it has proved to be at university levels.

3.2 DDL blended with TBLT

TBLT (Task-based language teaching) is a methodology in which learners are asked to complete tasks based on authentic texts using a target language. It has been used in ESO context since the late 1990's. Nunan (2004: 1) mentions some aspects that TBLT strengthens. First of all, it is said that students have to learn how to select content, how to introduce authentic texts into their learning process and that learners are not only aware of the language but also of the learning process itself. These specific aspects are also found when talking about DDL. Apart from that, something that TBLT also brings into the classroom is learner's own personal experiences, making them count when analysing the learning process as well as rising awareness of the language use in the real world. An additional aspect to point out is that nowadays high schools are using laptop and tablets with digitized books to cover the subject materials. Learners familiarity with technology is a fact and this could be a tool to be used in order to engage them to learn as well as to introduce DDL into their daily life.

One of the main obstacles found when analysing the success of DDL is that learners feel overwhelmed dealing with huge amounts of information when using corpus websites. In order to overcome this issue we can take some features from TBLT towards making DDL feasible in ESO contexts. Nowadays, high school subjects are mainly taught explicitly, meaning that the learner is aware of what it is learnt and the process itself. What TBLT does, is the opposite, using implicit knowledge. However, Ellis (2001) mentions a particular variation of TBLT which he calls 'Consciousness-raising tasks'. This differs from other applications in TBLT in key ways. First of all, Task-Based Language Learning is mainly intended to use implicit learning whereas using this variant, explicit learning comes first in the process. This is to say that the learner is first introduced with the linguistic feature that will be dealt with in class explicitly in order for them to understand

how it works. This information is provided by the teacher. Once this is understood, the task is set and given to students to complete it. In doing so, learners may feel more comfortable when analysing specific data since they already know how this language feature works and they can narrow the search. Apart from that, the language acquired can be integrated with real world language since they are already using authentic material to complete a meaningful task.

Another aspect of TBLT that can be used to implement DDL in ESO context is the way learners work. As mentioned before, DDL gives the students the opportunity to work as language investigator and to discover by themselves how language itself works. This is something that TBLT also provides. Furthermore, we have to analyse how students are divided within the classroom. Data-driven learning in university contexts have proved to be successful and we can imagine that students work individually. When adapting it to ESO classrooms, we should think of grouping students for them to complete the given tasks. This is something already done when using TBLT, where they have to work in small collaborative groups in order to share their individual experiences. Therefore, the problems that arise when using corpus websites can be solved by working cooperatively, helping each other overcoming difficulties as well as sharing knowledge.

An analysis of the roles that both teachers and learners have to adopt is needed. Originally, the teacher is just a guide and does not play an active role when using either DDL nor TBLT. If we assume that we are going to use the ‘consciousness-raising task’ model, the role of the teacher will change slightly. In this particular case, the teacher is the one who provides the student with the main linguistic feature rules as well as an explanation of it. It is just after the learner has understood the mechanics of it, the teacher becomes the second-tier. This change in the teacher role highlights each professional creativity as well as the capability of developing own materials to be dealt in class. Then, when the teacher moves away from the main picture, the given approach becomes student-centred, sensitizing “learners to their own leaning processes” and making possible “to make choices about what to do and how to do it” (Nunan 2004: 15). This does not mean that they are left alone

dealing with tasks using DDL but that they work cooperatively to solve issues rather than directly asking for help to the teacher.

Motivation is a factor generally lacking among teenagers when talking about learning. The way the tasks are prepared and the way corpus websites are designed could be an enhancing tool for this factor if we want this approach to work. Making tasks more appealing, not only visually but also in terms of content may be the key to attract them. The website design is something that teachers cannot handle. However, what they can do is to analyse each student interests and build up a topic selection to set up tasks. This can be done using online surveys asking students which areas of language, topics or things in general are they interested in. It is not easy to fulfil everyone wishes but taking into account that they are all in the same age, they may share some topics interests. Once all the topics are set, the only thing that has to be done is to integrate them into the tasks, following TBLT criteria as well as DDL. If students feel attracted by the topic, they will work in a more comfortable environment since they are motivated and the outcomes will be even more successful.

3.3 Problems and obstacles

The theory may seem perfect but there are some limitations regarding the application of DDL in the ESO context. The main obstacle of introducing DDL into ESO classrooms is the fact that this methodology is not widely applied among the educational community. If institutions do not highlight and raise awareness of the existence of DDL, it would be very difficult to introduce it into high school classrooms. This is also linked to the lack of research carried in ESO contexts and that teachers themselves do not really know how effective it would be and if this methodology would fit in their classrooms. Apart from that, the technical issues mentioned such as the difficulty in using corpus websites, could only be fixed if there is a high number of consumers. Ultimately, website designers would be waiting their time adapting such websites if not many people use them. Thus, the first thing that should be done is to raise awareness of the existence of DDL.

Furthermore, money is a key factor when dealing with sophisticated software. Education budgets are increasingly limited although depending on each high school, this may vary. It is not only software that is expensive but also teacher training. Another important issue is that teachers are not proficient enough in using DDL. The solution is simple to think but difficult to apply. Training does not only require money but also time. If we were to think that DDL could be implemented in ESO blended with TBLT, teachers would be trained to use corpora websites appropriately as well as taught how to prepare and produce tasks. However, it is true that when teaching you are always learning as well, and you should be able to adapt to changes. This is especially true nowadays with the introduction of new technologies into the classrooms.

Another potential problem is that high school curriculum may not adapt to the usage of DDL when teaching a foreign language. As far as I know, in Spain the subject of English in the ESO context is limited in terms of complexity. It is true that it depends on the high school but, more or less the aims and the objectives are the same everywhere. The main focus on the teaching process is to learn the basic grammatical structures and vocabulary to complete and to pass the term-test. Students are also trained in skills such as reading, listening or writing but in a very conventional way. If the aim is to fit DDL in in this curriculum, we should re-arrange the whole curriculum changing how English is perceived not only by teachers, but also students. It is also important to say that at present the exposure to English is limited since the students are only in contact with English 2 or 3 hours a week, something that makes it even more challenging to introduce new tasks that require some time to complete. Apart from that, ESO classes are not always the size they should be, and they combine different levels of the learners. Thus, within a class, you can have from low to advanced level, another obstacle when designing tasks and dividing the class into groups.

4. Conclusion

There are good reasons to accept that DDL is successful in university and tertiary education. However, there is still a long way to go in order to this methodology be widespread among ESO

context. The aim of this research was to analyse whether DDL would be feasible for ESO students. By analysing research on DDL in university contexts, drawing parallels between the potential implementation of DDL and the successful implementation of TBLT in ESO, and drawing on the author's experience as a former ESO student and ESO teaching assistant, the project has demonstrated the feasibility of DDL in an ESO context. Nevertheless, there are some limitations to this research.

Raising awareness among teachers and researchers is a must if we want to have solid results to see if this methodology could be part of secondary education curriculum. Taking the success of DDL in universities and its positive effects it is not enough if we want to persuade teachers and researchers to adapt it into ESO context. Although this study has shown via a comparison to TBLT that DDL could be successful in ESO, there is a need for further research. Empirical research like that analysed in Boulton and Cobb's (2017) meta-analysis should be carried out in ESO contexts to see if this methodology has a promising future.

Ultimately the success of DDL in an ESO context depends on the efforts that the educational community makes in order to support DDL. This responsibility not only lies on researchers themselves but also in language teachers and learners. There is great effort when adopting changes and even more if there are that radical in terms of complexity as well as lack of support and research. As far as I am concerned, the key factor for DDL to become a mainstream would be appropriate training in future language teachers. This should be done through universities that train future language teachers.

In my personal experience, it is true that is not always easy to introduce changes to the conventional way of teaching, but the world is changing and we must adapt if we want to keep up. Digital technology is more present every day in the classroom and it will probably be the only material used in class in some years' time. Despite the fact that changes are sometimes difficult to adopt, learners' interests and motivation are in the top of the list when it comes to teaching. What I

also feel attracted to is the role of learners as investigators, giving them freedom and responsibilities to become more independent, something that teenagers may enjoy.

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