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Field Lab

ONE.COST – Assessing social problems' costs

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ABSTRACT

The present Work Project is integrated into a project that is being developed for the IES - Social Entrepreneurship Institution, as a first step in a larger project named "One.Cost." This first step intends to identify the typologies that exist of social problems, involving social entrepreneurship and analyze methodologies that estimate the cost per unit in the area of education. As a second objective, it is also useful for any social organization that intends to measure its impacts on the cost-effectiveness and cost-effectiveness methodologies in Education area in Portugal.

Keywords: Social Problems, Social Impact Measurement, Cost-Effective Analysis, Cost-Benefit Analysis,

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Introduction

Social exclusion, unemployment, ageing society and school dropout rates are some of today's major issues. Such problems affect the quality of life in a society, which leads to an increase in costs associated with the public sector, that constantly tries to solve them. The main challenge is to try to reverse these trends and prevent other social problems from arising. Social entrepreneurship and innovation are central to the social sector when they create social change, adopting the mission of creating and sustaining social value.

These organizations end up investing capital in the social sector, with the aim of obtaining a financial return and a return of value to society. The positive outcomes (social impact) achieved, contribute to the development of the economic and social sector. To make sure the results will be positive, it is necessary to use tools to measure the social impact of an activity in the society. This research arises from this need. Conceived to identify the typologies of social problems that exist, involving social entrepreneurship and analyze methodologies that estimate the cost per unit in the Education area. It also aims to help any organization that wants to know how it can rigorously measure the impact of its activities in the social sector. A brief review of the literature is presented as first stage to provide a theoretical background to public and private challenges in solving social problems. A definition of social problem is provided and also an identification of how different actors propose to solve social problems. A brief description on the importance of measuring social impact is granted, describing two classical methodologies for cost estimation based on the literature review and a critical description of the methodologies being used by international entities that developed similar databases to One-Cost. A validation of these cost estimation methodologies of social problems will be applied to the Portuguese context based on the Education Sector.

Social Problems

A **social problem** is defined as a condition or conduct that is perceived to have negative consequences for more than just a few people (Barkan,2012). If there are only positive consequences, then there is no social problem (Guerrero,2005). Social problems have three components: an objective, a reality and a subjective component (Barkan,2012). Please see table 1, about the concepts of objective, reality and subjective components, in appendix. According to the social construction view, negative social conditions or conducts do not become a social problem unless citizens, policymakers, and other parties call attention to the condition or behavior and define it as a social problem (Rubington & Weinberg,2010). Portugal has been experiencing many social challenges, namely in the Education area. For example, the total of enrolled students by level of education in higher education is decreasing year by year[1]. Overall, there are many social needs, which makes it difficult to sometimes choose which one to address first, by social sector (Epstein&Yuthas,2014). The **social sector** refers to "organizations driven primarily by a social purpose such as non-profit or nongovernmental organizations and social enterprises" (Ebrahim and Rangan, 2014, p.118). As a result, stakeholders are motivated to intervene in a given cause in a number of ways (Epstein&Yuthas,2014). Plenty of reasons are valid reasons to intervene, as long as they are consistent with the values of the stakeholders. **Stakeholders** are important for the elaboration of strategies that aim to contest this social problem (Friedman, 1970). Stakeholder's Theory is very important because their interests in an organization are valid and a balance must be achieved between the satisfaction of all stakeholders and the judgmental selection in their choices (Friedman, 1970).

[1] http://www.pordata.pt/en/Portugal/Enrolled+Students+total+and+by+level+of+education-1002

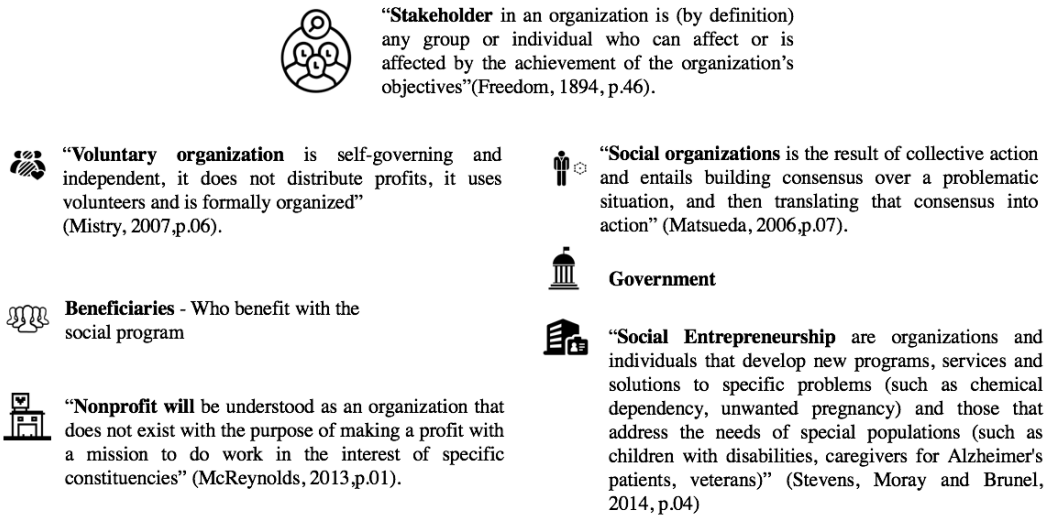

Figure 1: *Concepts of Stakeholders*

Source: Authors' own imagine base on (Fredon,1894), (McRoynolds,2013), (Matsueda, 2006) and (Stevens, Moray and Brunel, 2014).

Social Entrepreneurs

Once the social side has been analyzed and identified, the economic sector actors need to be taken into consideration. Several approaches to **create social change** should be considered to solve the problem (Epstein&Yuthas,2014).

To create social change, it is important to focus on creating solutions through organizations or one of the following initiatives: innovation (helping and testing models and processes), service delivery (providing products or services directly to help fight a social problem), capacity building (helping organizations improve their impact on society), research (providing useful information and solutions for the social sector), advocacy (promoting legislation and information with benefits for social impact) and infrastructure (providing networking and support techniques to increase impact) (Epstein&Yuthas,2014). Regarding **innovation**, it is quite important since it is one of the strengths of an organization (Kramer, 2005). Through this "great idea"(based on innovation), a unique vision to solve a social problem is highlighted, an innovative way to create even more impact on society (Kramer, 2005). However, who can innovate by creating a solution to a social problem? **Social Entrepreneurs** are, without a doubt,

among those who can. Social enterprises are a new type of social organization, which seek out superior innovative solutions that aim to address complex social problems that other entities cannot, are unable to or fail to solve. Social entrepreneur's innovations often lie on a new combination of social and business practices (Kroeger & Weber, 2014). Two views of the social entrepreneurship appear to prevail in the literature. Please see in table 2 in appendix.

Briefly, it can be said that social entrepreneurs are business entrepreneurs with a social mission dedicated to adding economic motivations to the non-profit sector (Mair, Robinson, Hockerts, 2006). A **mission** is central to organizations because it provides leadership to companies in relation to their strategy (Stevens, Moray & Bruneel, 2014). A well-defined mission serves as a reminder of the need to look outside of the organization, not only for beneficiaries but also for measures of success (Drucker,1989). The mission must have a target and the pretended outcome. Then, when the mission statement is clear, it will be better positioned to measure short and long term, positive social impact (Epstein & Yuthas, 2014). Social entrepreneurship organizations are agents of change in the social sector when they adopt the mission of creating and sustaining social value, when they recognize a search for new opportunities to serve their mission, when they interact in a process of continuous innovation, when they are not limited by current resources, exhibiting a greater responsibility for the ones they serve and for the results they create (Dees, 2001). However, it is important that the economic value (related to the economic and fiscal value) is inherent to the **social value** (collective term for acknowledging the value of all outcomes in the evaluation and the decision making). No matter what, a social entrepreneurship organization needs to consider the dichotomy of economic-social value.

For social organizations, it is sometimes unclear the difference between the social value created and the "good deeds" performed (Drucker, 1989). The first approaches to the concept of social value come from a subtractive perspective (Coase, 1960), which emphasize the social costs associated with negative externalities (Retolaza, San-Jose & Ruíz-Roqueñi, 2016).

Subsequently, with the emergence of the social sector there was a shift towards a more positive approach to generating social value in organizations with the emergence of the social sector (Retolaza, San-Jose & Ruíz-Roqueñi, 2016). Corporate citizenship (Néron and Norman, 2008) and Stakeholder Theory (Freeman 1984) refer to limited economic value. The problem is that good intentions are no substitute for organizations' accountability, performance and results. To understand and better control this, it is necessary to constantly measure outcomes (Drucker,1989). To have a **social impact** it is necessary to define what success means to the company and figure out how it will know when you have achieved it (Epstein & Yuthas, 2014). The term 'social impact' may overlap with 'social value creation' (Emerson, 2000) (Gentile, 2000). To create a social impact, or in other words, to reach the social value desired to satisfy social problems, it is necessary to use tools that can be measured (Hebb & Bhatt, 2014).

Social Impact Measurement

Tools that analyze the social impact of programs to solve social problems are based on social impact measurement. **Measurement** is an indicator that should monitor and evaluate the long-term impact (Twersky et al. 2010). Evaluating the blended value is a very important step to appraise social impact (Kroeger and Weber, 2015) (Kaplan, 2011). A brief analysis of some problems highlights the discrepancies between measured and social impact are granted. Some of these include:

	Source	Explanation
Funding Gap	Kaplan,2011 Austin et al,2012	Lack of resources needed to solve several needs, resulting in competition between organizations and stakeholders
Deviations from the social mission	Austin et al, 2012 Kramer, 2005	Trade-off between creation of social value and being a self-sustainable organization/program
Contribution to the field	Veldman, 2009 Twersky et al, 2010	Lack of cohesion in the diffusion of results, objectives and collaboration that will benefit the whole society
Comparison	Kroeger & Weber, 2015 Veldman, 2009	Comparison between implemented social interventions

Table3: *Problems highlights the discrepancies between measured and social impact*

Source: Authors' own imagine base on (Kaplan,2011), (Austin et al,2012), (Kramer,2005), (Veldman, 2009),(Twersky et al,2010) and (Kroeger&Weber,2015)

To circumvent and solve these lapses, it is necessary to have a greater transparency in the frameworks and to use a **social performance measurement** to simplify communication among all those involved (Kramer, 2005) (Kroeger and Weber, 2014). On the other hand, a good set of conceptual frameworks, analytical tools and management strategies have been developed (Lopez & Bell-Rose, 2003). There are many approaches to measuring social value and a set of social metrics that organizations use to assess the social value they create (Hebb & Bhatt, 2014). The problem is that social organizations consider that continuous measurement of social value can be costly and difficult to implement (Veldman, 2011). To facilitate this, traditional financial metrics are many times applied. **Financial metrics** allow an objective evaluation of managers' performance and the sustainability of a social program (Kramer, 2005). New financing models emerged at various levels (K.E, 2014). There is a diverse range of social investment instruments, all with a financial/social return profile (K.E, 2014). **Social investment** is the use of money to generate both social and financial returns and offers a way to help social organizations have access to suitable financing and improve their ability to generate impact (Ferreira & Miguel, 2014). New funding models are emerging at various levels and in parallel with traditional markets because of the urgent need to create a multidimensional measurement system (Kaplan, 2001). This happens because the academic work developed so far is considered frail (Kroeger e Weber, 2015, Ebrahim e Rangan, 2014). However, each measurement methodology requires gathering different conditions to be usable (Hebb & Bhatt, 2014). There are four elements that are fundamental to measuring the creation of social value: inputs, outputs, outcomes and impacts (Hebb & Bhatt, 2014). Inputs are resources used to produce outputs or activities, which result in outcomes for stakeholders (Hebb & Bhatt, 2014). The relation between them is called the logic model (Hebb & Bhatt, 2014). "A theory of change is a set of activities or tools that link your mission to your actions" (Bhatt & Hebb, **2013,p.04)**. This model

describes the actions and logics of cause and effect that transform the intended impact into a real change (Colby et al., 2004) (Epstein and Yuthas, 2014).

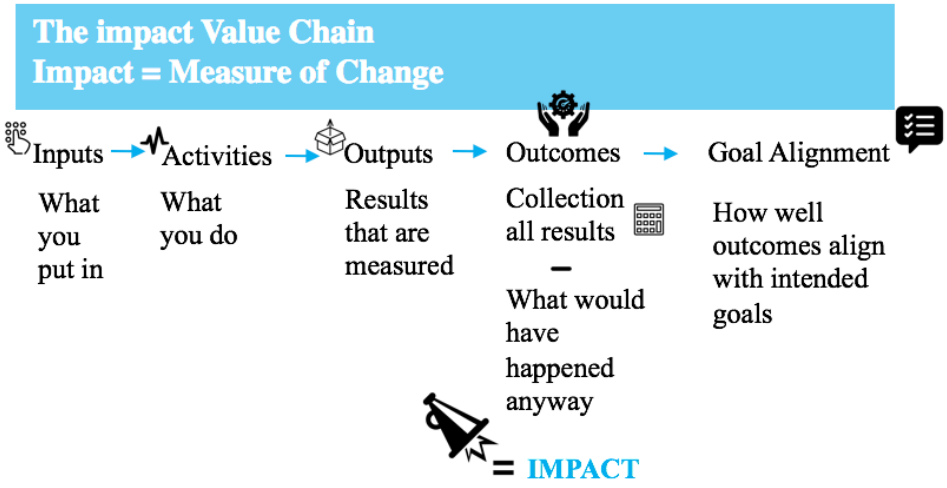

Figure 2: The impact Value Chain
Source: Rockefeller Foundation Double Bottom Line Project

Since impact is one of the objectives of organizations, impact must be measured in terms of its efficiency (Ebrahim & Rangan, 2014) (Emerson, 2003). The process, as previously mentioned, with inputs turning into activities, which in turn derive into outputs, which generate outcomes (which should be considered as something that would have happened even without the program), which in turn produce impacts (Ebrahim & Rangan, 2014) (Mass, 2014). However, to point out limitations: the results are not usually caused directly and exclusively by the organizations' actions (Ebrahim and Rangan, 2014) and are in constant interaction with the social, cultural and economic context (Austin et al., 2012 Kroeger and Weber, 2014).

In the **field of social impact measurement**, which refers to the methods that attempt to capture, measure and evaluate impact, the result is derived from an action, activity or program with social problems considered serious (Rauscher et al., 2012).

Many organizations take social initiatives that often have a positive effect on individuals, communities and the environment (Boyd, 2004). The objective of these initiatives should be to focus on improving the lives of as many disadvantaged people as possible with a minimum

amount of resources (Veldman,2009). These **social initiatives** can impact a large or a small number of people, depending on the purpose of the initiative (Wood & Leighton,2010). Both are positive for society. These organizations all face the same challenges because they have all the same questions – if the social initiatives change people's lives for the better, or how can they measure the social value and calculate its worth (Boyd,2004). To **measure the social value** and the objectives associated with the initiatives that are implemented, or what it is expected to reach, there must be standard and appropriate approaches and methodologies, as without them it is impossible to evaluate these initiatives (Veldman,2009). There are innumerable methodologies and approaches developed to measure social value (Boyd,2004). They can firstly be divided into 4 parts: Cost Analysis, Cost Effectiveness Analysis, Cost Utility Analysis and Cost Benefit Analysis. Please see table 4, on the different types of economic evaluation, in appendix.

In the social field, the agreement among experts is still feeble on such integrated cost approaches, which relate impacts to costs to make such investment decisions (Gates, 2008). However, according to the Bill & Melinda Gates Foundation, there are **four philosophical purposes behind these methodologies and approaches** (Gates, 2008). Please see table 5, about philosophical purposes behind methodologies and approaches, in appendix.

Among these four philosophical perspectives there is still another way of categorizing the measurements or the estimation of social value, through three main applications (Gates, 2008). Please see table 6, about three main applications of measuring social value, in appendix.

As with the different purposes, the various methodologies and approaches may include one or more of these possible applications (Gates, 2008). It is important to consider that each result obtained through a methodology, or through an approach, is only one factor that facilitates the decision process in an organization (Gates, 2008). The outcome of any methodology or approach should not be the only decisive factor to consider when implementing a project

(Cellini & Keep, 2010). One should first focus on choosing which of the methods to use. This choice will depend on what the organization wants to know, in concrete terms (Cellini & Keep, 2010) (Retolaza, San-Jose & Ruiz-Roqueñi, 2015). When evaluating a program, comparing this evaluation with more than one program; Wether the program has several objectives or is focused on only one (Cellini & Kee, 2010). These strategic decisions will influence the choice of the right methodology to apply - whichever area you choose to analyze. (Cellini & Kee, 2010) (Retolaza, San-Jose & Ruiz-Roqueñi, 2015).

This analysis will focus on an overview of cost integration in measuring and/or estimating the social value creation of two classical methods known as Cost-Effectiveness Analysis and Cost-Benefit Analysis. The choice of these two methods was made because every day, almost every organization creates its own evaluation approach. This makes the process of comparison between projects, with the same objective, extremely difficult as well as the help that could be obtained from a professional if the evaluation approach is known. In view of this reality, the CBA and CEA have been chosen as they are classical methodologies, which, although difficult to apply, are quite complete (Tuan, 2008).

Cost-Effectiveness Analysis (CEA)

Cost-effectiveness analysis (CEA) is a methodology that aims to relate the costs of a given program to its results (Cellini & Kee, 2010). Combine a few measures of impacts with costs to compare the unit costs of various policies targeting one particular outcome (Münich & Psacharopoulos, 2004) (Cannon, Karolv & Kilburn, 2001). It calculates the relation between the effectiveness that a program can achieve against a certain amount of costs, that is, it is the amount of costs necessary to reach a given impact (Dhaliwal, Duflo, Glennerster & Tulloch, 2012). In other words, it is the ratio of cost to a non-monetary benefit or impact (Gates, 2008). CEA can be applied at any time - before, during or after a program implementation, to help

decision-makers evaluate the effectiveness of a program (Cellini & Kee, 2010). It can also be used to prioritize interventions if they have common units of impact (Cellini & Kee, 2010).

Cost-benefit Analysis (CBA)

Cost-benefit Analysis is a useful tool for program evaluation (Cellini & Kee, 2010). CBA considers all the costs and all the benefits, expressed in monetary terms, that are associated to alternative policy decisions and outcomes (Münich & Psacharopoulos, 2004). Like CEA, it also identifies and places the costs of the programs in units, but goes a little further, as it can show those costs in relation to the unit value of the programs' benefits (Cellini & Kee, 2010). It is considered a more demanding methodology than CEA because it allows the comparison of more than one outcome (Münich & Psacharopoulos, 2004) - monetizes the benefits and costs that are associated with an intervention and then compares them to see which one is better (Cannon, Karolv & Kilburn, 2001). Cost-benefit analysis allows one to compare a program's benefit-cost ratio or its net value or its internal rate of return against another program across and within domains to make funding or allocation decisions (Gates, 2008) (Cannon, Karolv & Kilburn, 2001) (Tuan, 2008). If a comparison is necessary, CBA is used to compare alternative programs to see which one will bring the most benefits to society (Cellini & Kee, 2010). This methodology is the most useful when you are analyzing a single program or policy to determine if its total benefits for society exceed, or not, its costs (Cellini & Kee, 2010).

Steps to do Cost-Benefit Analysis and Cost-Effectiveness Analysis

The performances of CEA and CBA are demanding processes that include several steps (Cellin and Kee, 2015). So far, the definitions of methodologies have been presented in a simplified way, but obtaining the desired result can be quite challenging. Throughout the analysis, a series of assumptions must be made that sometimes influence the results (Cellini & Kee, 2010). To simplify the process of explanation and description, the ten-step process will be used, in an

adapted way, as developed by Boardman, Greenberg, Vining and Weimer in 2006.

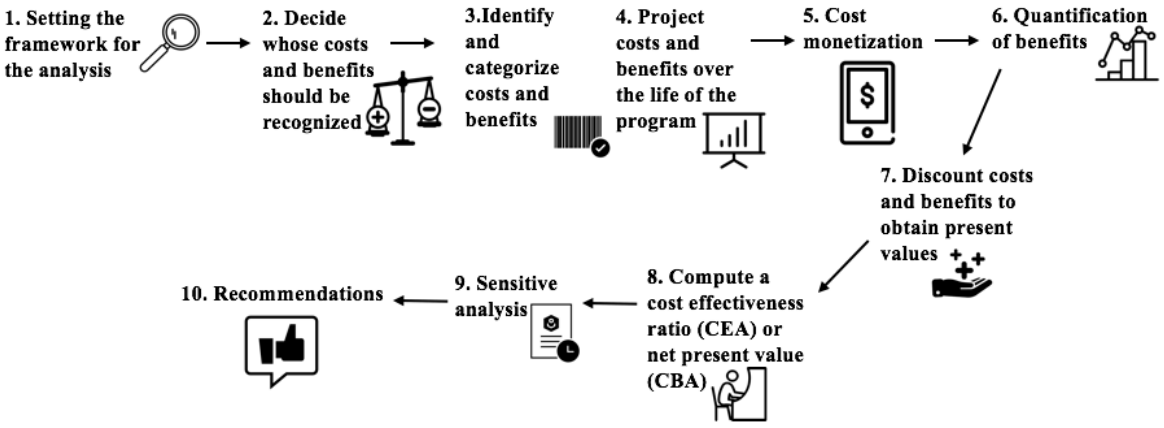

Figure 3: *Steps of Cost-Benefit Analysis and Cost-Benefit Analysis*
Source: *Author's own diagram based on (Cellin and Kee 2015)*

An example will be used to explain how this methodology can be applied to educations areas (based on real and fictitious data) – a dropout prevention program in higher education. To understand how to apply concepts, please see table 7 in appendices.

1. **Set the framework for the analysis**

Two aspects must be considered when you are choosing the more suitable framework: "status quo" and the timing of the analysis.

A first step in establishing a framework is describing the "**status quo**". "Status quo" is the state of the world in the absence of the social program (Cellini & Kee, 2010) (Tuan, 2008).

The costs and benefits that must be mentioned in both CBA and CEA are called additional costs and benefits (Cellini & Kee, 2010) – costs and benefits that arise for the program and not those that already existed. **Additional costs and benefits** are known as marginal or incremental costs or benefits of a program and, when these methodologies are applied, they must be featured under total costs, total benefits and units of effectiveness (Cellini & Kee, 2010).

Example 1: A dropout prevention program in higher education was implemented 2 years ago in Beja University and now the government wants to understand if it is worth the costs

associated to it. This program involves setting up an academy for students who are at risk of dropping out (Cellini & Kee, 2010).

2. **Decide which costs and benefits should be recognized**

In all the programs, there is an **involvement with stakeholders** and each cost and benefit influences a certain group of people (Cellini & Kee, 2010). In a public program, the costs can be largely borne by taxpayers, while the benefits are concentrated on a specific group of people who are covered by that program (Cellini & Kee, 2010) (Tuan, 2008). In a CEA or a CBA, the objective is to analyze the impact that this program will have on society as a whole, so the analysis includes all the relevant individuals (Cellini & Kee, 2010). These individuals must be chosen according to their needs by **geographic region**, so that a more rigorous criterion is measured (Deloitte, 2016). The smaller the geographic scope, the less costs and benefits will be analyzed / controlled (Cellini & Kee, 2010) (Tuan, 2008).

Example 2: The decision to invest in Beja University depends on the residents of Beja, where the program is implemented. The analysis should take into account the perspective of these residents and students.

3. **Identifying and categorizing costs and benefits**

Afterwards, it is necessary to **identify and categorize all costs and benefits** adjacent to the program, even if they are not determinant to the program (Cellini & Kee, 2010) (Udvarhelyi et al. 1992) (Tuan, 2008). A rigorous analysis should be carried out to examine those with the most significant implications in the program. After identifying them, it is crucial to distinguish which ones create a negative or a positive impact (Cellini & Kee, 2010). It can also be done through other analysis, comparing inputs and outcomes. Then, it is necessary to structure them. One way to do so is using the model that Musgrave developed in 1989, by separating them into different categories (Cellini & Kee, 2010). Following the categorization, there normally exist different perspectives on what can be a benefit and what can be a cost (Cellini & Kee, 2010).

Measuring and categorizing the types of costs to be calculated at this stage is crucial: direct, indirect and tangible costs and benefits. Tangible costs are perceived as one of the most difficult areas of cost-effectiveness (Cellini & Kee, 2010). Identifying financial costs and social costs is vital (Cellini & Kee, 2010).

Example 3: The costs of the program can be, for instance, the purchase of computers to be used in the institution or the cost of the salary of the consultant that manages the institution (direct, indirect and tangible) (Cellini & Kee, 2010). Benefits can be an increase in taxes that will be paid by program participants (indirect, tangible and fiscal) (Cellini & Kee, 2010).

4. **Project costs and benefits over the life of the program**

Once all the costs and benefits have been identified and categorized, it is necessary to **define the period of the analysis** (Cellini & Kee, 2010). The definition of the period will influence the costs and the benefits of the program (Veldman, 2011) (Tuan, 2008). It is advisable for the time unit to be annual (Cellini & Kee, 2010). Being advisable does not mean that it is compulsory. There are three types of analysis (Yates, 2015): ex post (when the information is already known and can help study whether the costs and benefits are up-front and accumulate only in the first year or if costs and benefits occur every year) (Cellini & Kee, 2010), ex ante (when there is a big benefit as the analysis can predict the impacts throughout the life of the program and, in this case, it is necessary to take into account the costs and the benefits as they can remain constant, increase, diminish or even disappear over time) (Cellini & Kee, 2010) or during the course of the program. The definition of the life of the program must always be in harmony with the program's life cycle (Cellini & Kee, 2010).

Example 4: In the case of participants, the main benefit will be the improvement in their future quality of life. It is therefore important to capture the total costs of the program during its first year of operation and to make an analysis to see if these costs are decreasing the number of withdrawals. However, the benefits must be analyzed with more time, such as whether there

was a saving in taxes (in a government perspective).

5. Cost Monetization

After the definition of the life cycle of the program analysis, one must consider **how the costs and benefits will change depending on the time frame chosen**. To do so, it is important to assign a unit of money to each cost (Cellini & Kee, 2010). The monetization of costs and benefits must always be done, especially in relation to intangible costs and benefits (Cellini & Kee, 2010). In CBA methodology, the idea is to have all the costs and benefits expressed in the same unit to facilitate their addition and the comparison (Cellini & Kee, 2010). Then, for each one, its nature should always be clarified, defining how they should be measured and calculated (Yates, 2015). For this, it is advisable to do an analysis called sensitivity analysis as it can help determine the reliability of the results (Cellini & Kee, 2010). To help understand what a sensitivity analysis is, some of the concepts that are called for and the errors in the elaboration of the analysis to be avoided need to be considered.

Example 5: If they are using a space that is dedicated to classes, not measuring whether they are having classes at that time or not, the cost of the room would represent an opportunity cost. This should only be put into currency if the school loses money because it is not renting it to other entities for other purposes. If the room was not used and the school would not use the room, whether the program is running or not, then there would be no cost. However, there is a possibility to put in additional costs that could be the maintenance of the classroom and should be considered in the analysis of the program as an incremental cost. If the school, on the other hand, purchases computers for this purpose, you must take into consideration that objects, where the duration is more than one year, should be amortized over the period in which the program is being evaluated - depending on the life of the project plus the cost of interest on the non-depreciated portion.

6. Quantify benefits in terms of units of effectiveness (for CEA), or monetize benefits (for CBA)

This is the stage where the methodologies differ, regarding the calculations that must be performed (Robinson, 1993). In **CEA methodology**, only the most important benefit (if there are more than one, the ratios are calculated separately) is quantified to obtain the units of effectiveness, which in turn will measure the success of the program (Tuan, 2008) (Cellini & Kee, 2010). Measures of effectiveness must always be related to the objectives of the program (Cellini & Kee, 2010). One of the strengths of CEA is the ability to provide comparisons between other programs, and therefore the measure of effectiveness must be matched to a benefit that is compared with others directly (Ashdown and Hummel-Rossi, 2002). The next step is to quantify this benefit, meaning to identify what benefits have arisen (under the status quo) by implementing this project (Cellini & Kee, 2010).

In **CBA methodology**, this goes further as it also identifies all the benefits, and assigns them monetary units (Cellini & Kee, 2010) (Tuan, 2008) (Yates, 2015). The more complex the program objectives defined in item 5 are, the more complex the analysis of these benefits will be, since it is necessary to put the benefits into monetary units. The most common techniques and challenges to be addressed in this analysis are: Nonmarket Goods and Services, Cost Avoidance, Time Saved, Increased Productivity, Property Values, Taxes, Value of the Environment and Chain Reaction Problem.

Example 6: The measure related to the dropout prevention program in higher education aims to increase the retention rate of students in higher education and therefore the measure of effectiveness should be the number of students who do not give up their studies or the Increase in the number of students completing the course (Cellini & Kee, 2010). The benefit is the students that have finished the course and therefore whose salary will be higher and stable, depending less on the government (reduction in unemployment benefit rates for example) (Cellini & Kee, 2010). However, as the objective of the program is to measure the effectiveness

of a single benefit, only the number of dropouts prevented or the number of students who have finished the course should be considered and measured (Cellini & Kee, 2010).

7. Discount costs and benefits to obtain present values

If you are doing an analysis to understand and analyze the costs and benefits of some programs, it is important to understand that the value that is spent in a program could be spent in another program - **cost opportunity** (Cellin and Kee,2015) (Veldman, 2011). To evaluate the opportunity cost it is necessary to place all the monetary values in their present value - start of the program (Cellin and Kee, 2015). The difference is that while the **CEA unitizes a real interest rate**, the CBA uses what is known as a social discount rate (r) to calculate the present value of all costs and benefits (Cellin and Kee, 2015) (Pollock, Aldridge & Lowe, 2014).

For **CEA the present value of a project's costs** is used as numerator in its cost-effectiveness ratio (Cellin and Kee, 2015). It is necessary to aggregate the costs each year, (Ct), where t denotes the year. The values of each year need to be converted to their equivalent of year 1, (1 - r) t – 1 (Cellin and Kee, 2015). To obtain the result it is necessary to add the present value of the costs in each year, meaning to get the present value of the costs for the entire project. Please see figure 4, Present Value of Costs calculation, in appendix.

In the case of **CBA, the discount stream** of benefits is identical to the formula applied on costs: in both methodologies, the computation performed is practically the same, the present value of the benefits must simply be subtracted by the present value of the costs, becoming the net present value, instead of the net profits (Cellin and Kee, 2015). Please see figure 5, Present Value of benefits calculation, in appendix.

Example 7: If the cost is 100 euros and the benefit is 20 students in the first year and then in the second year the cost is 120 euros and the benefit is 10 students, it is not a good sign and the net present value will possibly be negative.

8. Compute a cost - effectiveness ratio (for CEA) or a net present value (for CBA)

This is the stage where the cost - effectiveness ratio for the CEA and net present value for the CBA is calculated.

To calculate a **CE ratio**, it is necessary to **calculate the present value of the costs** and the units of effectiveness, instead of calculating the total costs (as done in equation (a)) (Cellin and Kee, 2015). Please see figure 6, Cost-effectiveness ration, in appendix.

If the objective is to compare several projects, the CE is calculated for each of the projects separately (Cellin and Kee, 2015). Greater care must be taken when the scales between beneficiary groups are very different (Cellin and Kee, 2015). This methodology should be used with beneficiary groups with the same scale to avoid problems in their analysis.

To calculate **CBA**, the first choice is the calculation of Net Present Value. However, there are also two other alternative calculations that can be done as a complement to the NPV calculation: Benefit-cost ratio and internal rate of return. This calculation "estimates how many people these projects will benefit, forecasts what projects will cost the public sector and estimates the value of project benefits to the public including the wider economy" (Pollock, Aldridge & Lowe, 2014, p.10).

Net Present Value "is a measure of the additional value created by implementing the project" (Pollock, Aldridge & Lowe, 2014, p.21). To provide a consistent measure of costs and benefits now and into the future, future costs and benefits are discounted to produce Present Values (PV) (Pollock, Aldridge & Lowe, 2014, p.21) (Cellin and Kee, 2015). Please see figure 7, Net Present Value, in appendix.

The propose of **Benefit-Cost Ratio** "is to provide a consistent procedure for evaluating decisions in terms of their consequences" (Dreze, J. & Stern, N. in Auerbach A.J. & Feldstein, M., 1987, p.909). BCR compares the total expected costs of each option against the total expected benefits (Schmidt, 2009). Please see figure 8, Benefit-Cost Ratio, in appendix.

The **Internal rate of return** is the discount rate that makes the NPV = 0. IRR is very useful as it helps make decisions on a project - if the result of IRR is greater than the required return, the analyst can accept the project. Please see figure 9 in appendix.

Example 8: If CEA's total cost is 100 divided by the number of hired dropouts, ie. 20, the cost of avoided drop-out is 5. Therefore, the net value will be the PV of the benefits to be divided by the PV of the costs. This will give the cost-benefit ratio.

9. Perform sensitivity analysis

After computing the cost - effectiveness ratio (for CEA) or a net present value (for CBA), a **sensitivity analysis** should be performed, by testing the sensitivity of the analysis of assumptions (Cellin and Kee, 2015) (Udvarhelyi, 1992). The goal of sensitivity analysis is to provide a sense of how large of an effect an omitted variable or variables would have to have to invalidate a finding (Clarke, 2014). This is done by testing the results and modifying some or all assumptions (Udvarhelyi, 1992). There are two main types of sensitivity analysis — partial, when only one assumption is varying at a time, or extreme, when all the assumptions under the best or worst scenario possible are tested (Cellin and Kee, 2015).

Example 9: In a sensitivity analysis, the main assumptions and parameters of the program should be considered as: 20 dropouts prevented over 3 years and opportunity cost for students in lost earnings was 300.

10. Make a recommendation where appropriate

The last step of this analysis is to **make a policy recommendation** (if possible and applicable). In the CBA, if the net present value is positive the policy should be implemented. If, on the

other hand, the net value is negative, the policy should not be implemented and the program should not proceed (Cellin and Kee, 2015). CEA does not have an indicator as obvious as the CBA but one's own judgment must be used, as to whether the cost of effectiveness is sufficiently low to merit adoption (Cellin and Kee, 2015). However, when more than one program is being considered, the program with the lowest CE index should be chosen (Cellin and Kee, 2015).

Example 10: The analysis does not include any negative psychological effects for students that should be considered because they may be subject to stigma from other students for being associated with the program.

As results, the comparison of these two models can be presented to perceive their differences:

Source	Cost-Benefit Analysis	Cost-Effectiveness Analysis
Naimpally, 2015	Compares the monetary value of all benefits with all program costs.	Cannot do so
Dossetor, 2011	Assesses whether the investment should be made in the program	Evaluates which program is most effective at the lowest possible cost
Jamison, Breman, Measham, Alleyne, Claeson, Evans, Jha, Mills & Musgrove, 2006	Provides the effectiveness of the program	Defines the alternatives in terms of benefits per unit of cost
Boardman, Greenberg, Vining & Weimer, 2001	Evaluates which program has the highest net benefit and whether it is profitable	Identifies a program with higher cost-effective, at a time
Naimpally, 2015	Needs information on all costs and benefits in monetary terms	Measures costs and estimates physical benefits
Cellini & Kee, 2010	It takes a long time to be analyzed	It takes less time to be analyzed
Cellini & Kee, 2010	Considers all impacts	Only considers one impact
Boardman, Greenberg, Vining & Weimer, 2001	Does not need to have different alternatives in its analysis	Needs to have different alternatives in its analysis because the cost effectiveness result is only considered useful if compared to an alternative

Figure: *Comparting of Cost-Benefit and Cost-Effectiveness*

Source: Authors' own imagine base on (Naimpally,2015), (Dossetor,2011), (Jamison, Breman, Measham, Alleyne, Claeson, Evans, Jha, Mills & Musgrove, 2006), (Boardman,Greenberg,Vinning &Weimer,2011) and (Cellini & Kee, 2010).

Education Sector

Racism and dropping out of school are social problems that are present in the Portugal Education Sector. Several programs, executed by the government or other entities, have been developed with the aim of fighting these social problems (Levin, 1983). Several researchers have shown that this investment can make a positive difference in, for example, student performance (Greenwald, Hedges, & Laine, 1996; Verstegen & King, 1998). However, resources are limited and the results obtained by this investment are very difficult to analyze and controversial (Greenwald, Hedges, & Laine, 1996; Verstegen & King, 1998). For example, when the Portuguese Government inserted "Magalhães" computers in schools, with the aim of modernizing schools, or other projects that were defined but because they do not use methodologies, do not achieve their objectives:

Source	Area	Goald
UNESCO, 1961	Development of education Africa	1980 primary enrolment in Africa should be 100%, relative to 40% in 1960
UNESCO, UNICEF, the World Bank and UNDP, 1990	Education for All	Universal primary education by the year 2000. By 1999 the net enrolment ratio is Africa was 57%
United Nations Millennium Summit, 2000	Children's primary education	Universal primary education by 2015
European Council (Lisbon), 2000	drop-out school, secondary level school	Proportion of early school leavers should be no more than 10% by 2010

Figure: *Organization's Program Golds*

Source: Authors' own imagine base on (UNESCO,1961), (UNESCO, UNICEF, the World Bank and UNDP, 1990), (United Nations Millennium Summit, 2000) and (European Council - Lisbon, 2000).

As already discussed, the measurement of social impacts must be done in a rigorous way in order to make informed decisions on the best way to invest in this sector (Chambers, 1999). For that educational decision makers need more complete information on the relationship between costs and outcomes, for example, of student performance, which should include

details of how services are provided (Chambers, 1999). These methodologies include several cost analysis techniques, such as cost-benefit analysis and cost-effectiveness analysis.

To apply these methodologies, it is necessary to know their advantages and disadvantages (Ashdown & Hummel-Rossi, 2002). Please see table 8, on the advantages and limitations of the three approaches, in appendix.

After a research on the application of this methodologies in society it is concluded that there are only a few studies on the cost-benefit and / or cost-effectiveness analyzes in relation to the program's decision-making (Hummel-Rossi& Ashdown, 2002).

Authors such as Barbara Hummel-Rossi and Jane Ashdown have explored how these methodologies can be applied in the education sector to measure educational reforms or increase services to at-risk students (Hummel-Rossi & Ashdown, 2002). However, in their research, they say that the application of cost-benefit and cost-effectiveness analysis is quite limited in education (Hummel-Rossi & Ashdown, 2002). Some examples where these methodologies have been applied will be provided:

Source	Area	Methodology
World Bank,1998	Higher Education Program in Vietnam	CBA
Unesco, 2011	School-Based on Sexuality Education in six countries	CEA

Figure: *Methodologies applied inWorld Bank and Unesco*

Source: Authors' own imagine base on (World Bank, 1998) and (Unesco, 2011)

In relation to the methodology used by the World Bank we can verify that there were great difficulties throughout its application. This organization first began by requiring projects to be conducted through an economic analysis to determine which project benefits outweighed its costs (World Bank 2010). Often, even in this project, it has been difficult to put these benefits in monetary terms, even saying that education projects are by far the least likely to report the results through a CBA in its evaluation (World Bank 2010). This has made many of their projects use alternative metrics like the CEA methodology.

As already mentioned, the choice of a methodology should be made based on the intended outcome. Cost-Effectiveness Analysis outcome is a real cost, while CBA outcome is a social cost (Barnett, 2016). As the objective of one-cost is focused on knowing the cost-effectiveness, for example "what is the annual cost of a university student", the choice of the methodology to be applied needs to be a Cost-benefit analysis.

Cost-effectiveness analysis provides resources to estimate the costs of two or more educational alternatives, as well as the effectiveness of each alternative in producing a common result. Based on this information, it is possible to determine which alternative produces the most educational effectiveness for a given cost or the lowest cost for any level of education.

Before starting to develop the methodology, a clear definition of what social issue needs to be addressed is necessary (Delloite, 2016). This allows the desired outcome to be easier to achieve and will ensure that the program remains focused on its core objectives. The definition of the social issue should start by defining the problem (students who drop out of higher education); Establish the target cohort (students between 18 and 23 years from the university of Beja); Quantify the prevalence (on a year of analysis, 24 students are at risk of dropping out of the course and there is a high probability of 20 students considering giving up), or incidence (5 new students are at risk of dropping out of the university of Beja and there is a high probability that 20 students will consider giving up); Define the desired outcomes and take into account the number of unemployed people in the region.

Conclusion and Recommendations

Social Impact measurement methodologies should be used to measure all social programs in Portugal. Areas such as health already have a very significant workload in Portugal but the education sector is quite limited. Although there are many social programs in Education, their measurement is limited or almost null.

Methodologies such as Cost-Effectiveness and Cost-Benefit analysis should be implemented in all programs that are developed. However, it must be known that there are many limitations to the implementation of these metrics. During this investigation, it was possible to verify the lack of data that exists for the elaboration of a methodology. It is often not possible to know what the costs associated with a specific institution (school) are or, when it is possible, they are very different, in comparison with other schools with the same number of students.

In order for the project "One-Cost" to be able to provide the desired outcome it is necessary that there be greater clarity in the data that is given out by educational institutions. Data on costs is sometimes difficult to find and should therefore be disclosed in a single way. This makes it easier for a cost-effectiveness calculation to be valid and correct.

It is very important that social charisma organizations in education develop programs based on specific and non-vague goals because they are difficult to measure and often the outcome is not what is desired. There should be greater rapprochement between the government and social entrepreneurs for more efficient information sharing.

In a first step, the methodology of cost-effectiveness should be implemented since it is easier to apply and because organizations that want to know specific costs of an institution should be measured in cost-effectiveness.

This was an important step towards a consensus on several concepts that will be addressed in this project, as well as to analyze the limitations that exist in the methodologies and their applications in the area of education.

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