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Information System to Manage the Evaluation of Performance of Education Professionals in a Pre-School – A Model in Development

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Abstract — One of the most important issues nowadays is to prepare our children to create a better world in the future. This is an education issue that starts in the very beginning of their lives. How can day care centers and pre-schools contribute for this goal? Our children spend most of their first years in these institutions, and parents trust the the teachers and other professionals of education to do a good job with their kids. In fact, the most important figures in this equation are the education professionals that work directly with the children. Having this in mind, one of these institutions' main concerns should be to have a clear view of what goes on in the workspace everyday between the professionals and the children.

The aim of this work is to propose a model for an information system that reports relevant information regarding the evaluation of education professionals. With this information, pre-school directors can have a much better understanding of what is going well, and what needs to be changed in the institution, in order to provide better care for the children.

Keywords – information system; education; children; day care centre; pre-school; performance evaluation.

I. INTRODUCTION

“Besides the initiation to society that pre-school education programs and centers provide, children that benefit from this kind of education have a more favorable disposition towards school and are less likely to its prematurely abandonment than the ones that did not get that opportunity. An early initiated schooling can contribute to an opportunity equality, helping to overcome the initial difficulties of poverty, or an underprivileged social or cultural environment. It can considerably facilitate the social integration of children that come from immigrant families or cultural or linguistic minorities. Additionally, the existence of educational structures that host pre-school aged children facilitates women participation in social and economic life” [1].

This UNESCO's report citation gives us an idea of the impact that an early education can have in our society. To improve this important assignment, a pre-school created an initiative for a performance evaluation system for its employees. At this first stage, and given the complexity of the task, there are some difficulties in the analysis and study of the

performance evaluation data. To respond to this necessity, this project is set to develop an information system (IS) that can help on this process, providing relevant information promptly, and allowing the directors to make informed decisions about the most problematic issues, in a way that they can mitigate or even solve them.

The main motivation in the development of this project stands on a desire to help a pre-school that has a great personal meaning to the author, since it was the first social environment where she grew up. A longstanding institution like this should be constantly evolving according to the new standards of education and technology. This project will help combining the two, using technology to improve the process of employees' performance evaluation. Being the first time that a process of performance evaluation is implemented in this institution, it's a big priority for all stakeholders, which will help immensely in getting their support and ultimately having a successful project. This will not only be an academically valuable project but will also have a practical value, that can be adapted to other similar institutions in the future.

This work aims to generally improve the performance evaluation process in its various stages. Its main goals are:

- Make the process intuitive for everyone involved: evaluated professionals, evaluators and decision makers;
- Create evaluation forms promptly and in an easy way;
- Make evaluation forms easy to perceive and to fill for both evaluated and evaluators;
- Import all the evaluations' data to a single database in an instant;
- Be able to know which evaluations are finished and which are still missing for a given year;
- Search and view specific evaluations;
- View reports with relevant data regarding the evaluations' scores.

The methodological approach of this project starts with interviewing the institution's professionals and decision makers to understand how the process of performance evaluation works, its requirements and its issues. This phase will help in the next step which consists in modelling the system through UML diagrams that meet the collected requirements. With these deliverables, after analyzing carefully the list of requirements and problems to be solved, and modelling the system through UML diagrams, comes the development of the systems prototype that should be tested and approved by the stakeholders through all its phases.

In this paper the definition, scope and motivation of the project are described and its theoretical subjects are briefly discussed. Then the work that has already been developed will be synthetically presented with the mention of next steps to be taken.

II. THEORY

The main subjects in this project are education, early-childhood education, performance evaluation and information systems.

"In confronting the many challenges that the future holds in store, humankind sees in education an indispensable asset in its attempt to attain the ideals of peace, freedom and social justice. (...) The Commission does not see education as a miracle cure or a magic formula opening the door to a world in which all ideals will be attained, but as one of the principal means available to foster a deeper and more harmonious form of human development and thereby to reduce poverty, exclusion, ignorance, oppression and war. (...) Education is also an expression of affection for children and young people, whom we need to welcome into society, unreservedly offering them the place that is theirs by right therein – a place in the education system (...). This elementary duty needs to be constantly brought to mind, so that greater attention is paid to it, even when choosing between political, economic and financial options. In the words of a poet: 'The Child is father of the Man'" [1].

As pointed out by the previous citation from UNESCO, education is one of the most important areas in personal and social development and it is constantly evolving. It's a vital subject in improving our future society and the way we live in it because young people and children of today are the adults of tomorrow.

Early-childhood education is the beginning of a full life of learning and without it or with a weak one, all following phases can be greatly neglected. Nowadays, this impacts immensely the future quality of life of every family as referenced not only by the following citation but also by [2] and [3].

"It's within the family, but also and even more, at the level of basic education (which includes especially pre-primary and primary schooling) that one cultivates its attitudes towards learning that will last throughout life: the creativity spark can begin to shine or, on the contrary, become extinct; the access to knowledge can become, or not, a reality. It's then when each one of us acquires the instruments for future development of our reasoning and imagination skills, personal discernment

capacity, responsibility sense and learn to carry out our curiosity towards the surrounding world." [1].

The performance evaluation of teachers is one of the measures that should be taken into account when aiming to improve the quality of education and the one in subject for this project as per the following citation.

"The importance of education's quality, and therefore the teachers, cannot be stressed enough. It's in the initial state of elementary education that children attitudes towards learning are essentially formed, just like their self-image. The teacher, in this stage, plays a key role. (...) Improving the quality and motivation of teachers must then be a priority in all countries. Following are some measures to achieve that.

- Recruiting (...)
- Basic training (...)
- Continuous training (...)
- Teachers with pedagogical training (...)
- Control – Inspection should not only control teachers' performance, but also keep a dialogue about knowledge evolution, methods and information sources. Ways of identifying and reward good teachers should be considered. It's necessary to evaluate tangibly, coherently and regularly evaluate the pupil achievements. The learning results and the role played by the teachers in them should be greatly considered.
- Management (...)
- Involvement of external agents to the school (...)
- Working conditions (...)
- Learning facilities" [1].

The positive outcomes of this measure in education has been the subject of several studies like [4] and [5]. "The estimates presented here provide evidence that subjective evaluation can spur growth in human capital that improves employee performance even after the evaluation period ends. (...) We demonstrate that, (...) experienced teachers provided with relatively detailed information on their performance improved substantially" [4].

Regarding the last topic: why use an IS for this issue? Using Kartchner's words: "A Content Management System allows content to be stored, retrieved, edited, updated, controlled, then output in a variety of ways such that the incremental cost of each update cycle and output production shrinks dramatically over time. It is a great concept" [6]. In today's information era, where important contents need to be available to consult at a blink of an eye, an IS is the obvious choice. Therefore, by taking advantage of an IS, this project intends to facilitate the process of performance evaluation of the pre-school managing to save workload, time, and thus, also financial costs.

III. THE SYSTEM AND ITS REQUIREMENTS

In the requirement gathering phase, there were two main tasks: to define the composition of a performance evaluation

and to understand what Key Performance Indicators (KPIs) should be measured and presented in the final reports.

Regarding the composition of the performance evaluations, each of them will have 3 types:

- Transversal, which will hold all questions regarding a set of skills that will apply to any professional category;
- Specific, which will hold all questions regarding each professional category specifically;
- Goals, which will hold all goals for each professional category specifically.

All transversal and specific type questions will have a scale of evaluation between 1 and 5 being that 1 corresponds to “Never” and 5 to “Always”. All goals will have 1 and 0 as possible values, corresponding to “Goal met” or “Goal not met” respectively.

The transversal evaluation will be divided in 6 different groups:

- Professional autonomy;
- Interpersonal relationship;
- Communication;
- Personal development;
- Discipline and work commitment;
- Change and innovation.

In this IS the user will be able to create all the necessary data in the database regarding the school year, class rooms, professionals and evaluations. After that, the user can ask the system to create an evaluation form in an Excel file that each evaluated professional should fill with their own assessment of the evaluation. Then the evaluator can fill the rest of the form with the evaluation itself. The user can then import the information of the evaluation form through the system to the database. There should also be a functionality that gives the user the possibility to view the list of evaluations that were not imported yet for a given year. This will be the usual flow in the system for all evaluations. In the end, the user can view a number of reports that were identified in the requirement analysis phase.

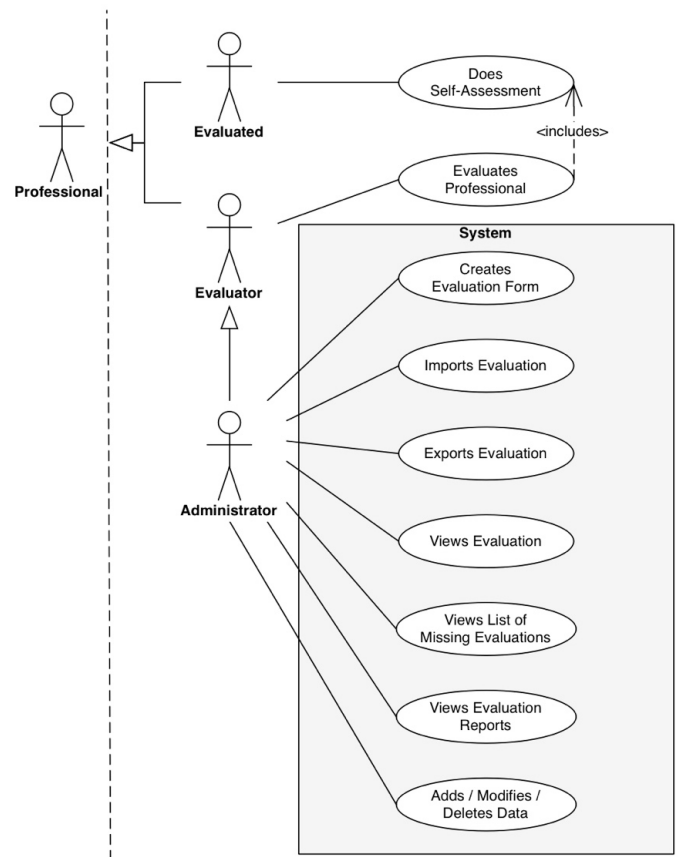


Figure 1. Use Cases Diagram

There information stored in the system should include the following:

- The pre-school: school center, school year and class rooms;
- The professionals: person, professional category and class room assigned to in a given year;
- The evaluations: evaluator, evaluated, school year, question and its type and group, final self-assessment grade and its date, final evaluation and its date, self-assessment and evaluation for each question.

In the conceptual classes diagram below all information necessary is described in more detail.

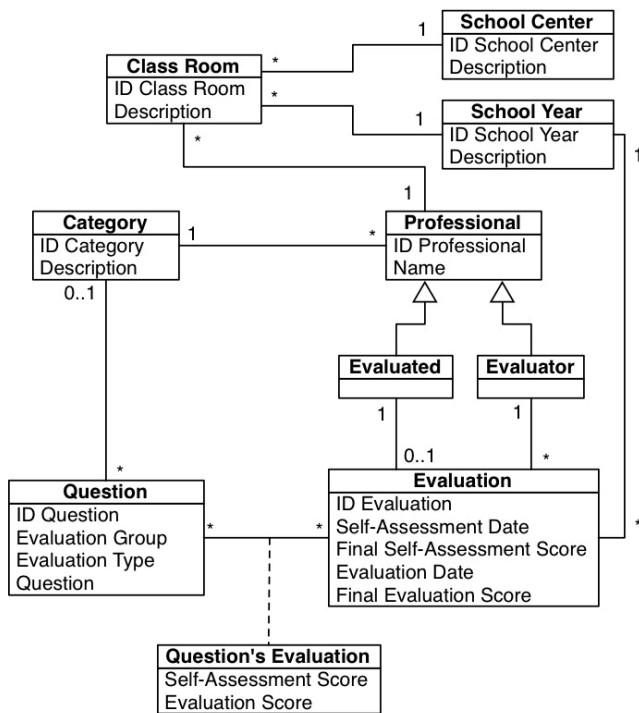


Figure 2. Conceptual Classes Diagram

For the IS itself and its database, the class diagram was transposed to the relational schema below.

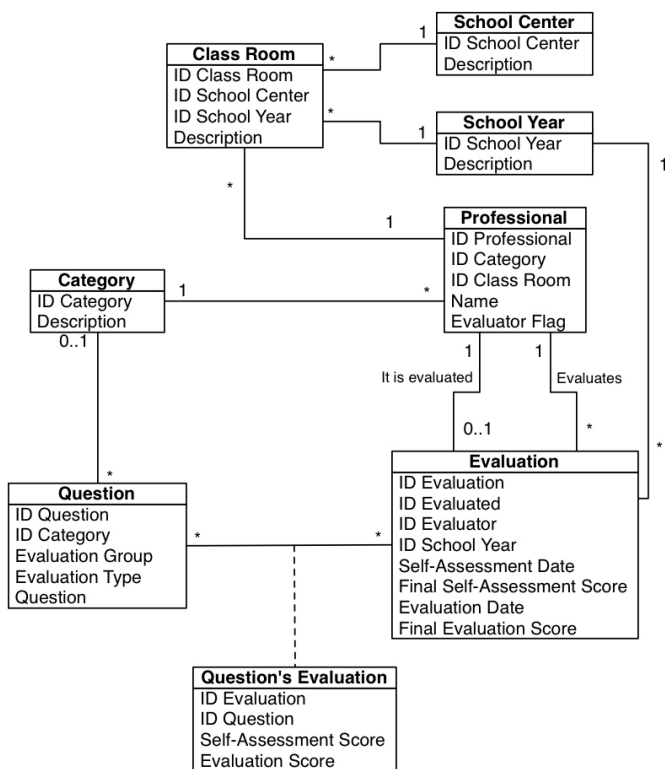


Figure 3. Relational Schema

For the KPIs, there are 12 that were already captured during the stakeholders' interviews and they are all regarding each school year. They are the following:

- Average score of each question;
- Average score of each question per professional category;
- Average score of each question per class room;
- Average score of each evaluation group;
- Average score of each evaluation group per professional category;
- Average score of each evaluation group per class room;
- Average score of each evaluation type;
- Average score of each evaluation type per professional category;
- Average score of each evaluation type per class room;
- Number/percentage of evaluations with score below 3;
- Number/percentage of evaluations with above below 3;
- Discrepancy between professionals' self-assessment and the evaluation score.

These should be the KPIs that will ultimately help the decision makers understand the quality of their professionals and intervene with the necessary actions to improve the service provided by the pre-school.

IV. PROTOTYPE DEVELOPMENT

The prototype for this IS is being developed taking into consideration the diagrams outlined in the previous section. It will be implemented using Microsoft Excel, since it is a well-known and easy to access application for the end-users of the pre-school.

The main concern with this prototype is that it will be easy to use in the pre-school computers by any person with basic comprehension of a simple software. Given this, a user-friendly interface is essential, and for that to be achieved, Microsoft Excel forms and Microsoft Visual Basic for Applications will be used. This will also allow the prototype to search, store and modify the relevant data in the database and show it to the end-user.

V. BRIEF CONCLUSION

The intended result for this project is the development of an IS's prototype that supports the process of evaluation of performance of education professionals in the pre-school. This prototype has as its main goal to facilitate the assessment process of all professionals in the institution, so that it requires little manpower, little to no financial costs and also saving a considerable amount of time. and to give its users the power to understand the main gaps in their professional work, so that initiatives can be prepared.

So far, the requirements gathering and modelling of the IS phases are completed. Next steps include the implementation itself and a testing phase with the end users to detect possible improvements and have confirmation of the implemented requirements.

It should be noted that in this particular project, the prototype will be developed taking only in consideration the requirements of the pre-school in study, so it will be custom-made for this purpose. Any attempt to extend this work to other institutions can and should be made in other projects with a wider scope.

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