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**An Information Systems' Model of Internal
Communication with and Between Teachers, as Internal
Stakeholders, in Portuguese Public Schools**

Eugénia Maria Vicente Luís

**Doutoramento em Educação, na área de especialização em
Educação a Distância e Elearning**

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**Tese orientada pelo Professor Doutor António Quintas Mendes e pelo
Professor Doutor Pedro Isaías**

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ABSTRACT

Internal communication is a key factor for the sound functioning of organisations and a competitive advantage. The involvement of the internal stakeholders is a key issue for the future of any organisation. Equally important is also to define a crucial internal communication policy for cooperation and to motivate the relationship between their stakeholders.

This research presents a study within the scope of internal communication with teachers, as internal stakeholders, in Portuguese Public Schools in the following dimensions: role of internal communication, communication vehicles, levels of satisfaction, democratisation and opening of the school board and the Moodle Platform as communication vehicle.

The techniques used for data collection were document analysis, structured interviews and a structured questionnaire.

With regard to the questionnaire, it was applied in the months of February, March and April 2017 to the teachers of 53 Portuguese Public Schools. The number of responses was 191. Factor analysis was the main technique used to uncover the underlying factors behind stakeholders' opinions and behaviours.

This study allowed to verify that the dimensions studied play a determinant role and that an appropriate internal communication is an instrument that enhances Portuguese Public Schools' organisation in pursuing their goals and becoming more and more active in their environment.

Finally, based on all the work developed, this research study proposes a new successful model of an Information System based on the DeLone and McLean (2003) model, which allows knowing the satisfaction of internal stakeholders in Portuguese Public Schools, in the context of internal communication, using the Moodle Platform as communication tool.

In short, this study shows how internal organisational communication is an important organisational factor in Portuguese Public Schools, which improves teachers' performance, as internal stakeholders.

KEYWORDS

Information Systems, DeLone and McLean Information System Success Model, Internal Organisational Communication, Internal Communication, Stakeholders, the Moodle Platform as a Communication Tool, Factor Analysis.

RESUMO

A comunicação interna constitui um fator chave para o bom funcionamento das organizações e uma vantagem competitiva. O envolvimento dos *stakeholders* internos é uma questão fundamental para o futuro de qualquer organização. Igualmente importante é, também, definir uma política de comunicação interna crucial para a cooperação e motivar a relação entre os *stakeholders*.

Esta pesquisa apresenta um estudo no âmbito da comunicação interna com os professores, enquanto *stakeholders* internos, nas Escolas Públicas Portuguesas nas seguintes dimensões: papel da comunicação interna, veículos de comunicação, níveis de satisfação, democratização e abertura do conselho escolar e plataforma Moodle como veículo de comunicação.

As técnicas utilizadas para a recolha de dados foram as seguintes: análise documental, entrevistas estruturadas e questionário estruturado.

No que diz respeito ao questionário, este foi aplicado nos meses de fevereiro, março e abril de 2017 aos professores de 53 Escolas Públicas Portuguesas. O número de respostas foi de 191. A análise fatorial foi a principal técnica utilizada para encontrar os fatores subjacentes às opiniões e comportamentos dos *stakeholders*.

Este estudo permitiu verificar que as dimensões estudadas desempenham um papel determinante e que uma comunicação interna adequada é um instrumento que melhora a organização das Escolas Públicas Portuguesas na prossecução dos seus objetivos, tornando-se cada vez mais ativas no seu meio ambiente.

Finalmente, com base em todo o trabalho desenvolvido, esta pesquisa propõe um novo modelo de Sistema de Informação bem-sucedida, baseado no modelo DeLone e McLean (2003), que permite conhecer a satisfação dos *stakeholders* internos nas Escolas Públicas Portuguesas, no contexto da comunicação interna, utilizando o Moodle como ferramenta de comunicação.

Em suma, este estudo demonstra como a comunicação organizacional interna é um fator organizacional importante nas Escolas Públicas Portuguesas, que melhora o desempenho dos professores, enquanto *stakeholders* internos.

PALAVRAS-CHAVE

Sistemas de Informação, Modelo de Sucesso *DeLone e McLean Information System*, Comunicação Organizacional Interna, Comunicação Interna, *Stakeholders*, Plataforma *Moodle* como Ferramenta de Comunicação, Análise Fatorial.

DEDICATÓRIA

Dedico este trabalho à minha querida mãe Maria Helena, que amo com
todo o meu coração.

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Gostaria de agradecer a todos aqueles que contribuíram para a realização desta Tese de Doutorado:

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TABLE OF CONTENTS

ABSTRACT	III
KEYWORDS	IV
RESUMO	V
PALAVRAS-CHAVE.....	VI
DEDICATÓRIA.....	VII
AGRADECIMENTOS.....	IX
TABLE OF CONTENTS	XI
LIST OF TABLES.....	XIV
LIST OF GRAPHS	XVII
LIST OF FIGURES.....	XVIII
LIST OF ACRONYMS.....	XIX
CHAPTER I – INTRODUCTION.....	1
1.1. Introduction	1
1.2. Objectives of the Study	5
1.3. Research Questions.....	6
1.4. Research Hypotheses	6
1.5. Scheme of investigation for the research work.....	7
1.6. Structure of the thesis	10
CHAPTER II - LITERATURE REVIEW.....	11
2. Literature Review.....	13
2.1. The role of Information Systems.....	13
2.2. DeLone and McLean’s Information System success model	16
2.3. Internal Organisational Communication	24
2.4. The Importance of Internal Communication for Stakeholders	27
2.5. The Moodle Platform as communication tool	31

2.6. Portuguese Public Schools as Organisations.....	35
CHAPTER III - RESEARCH METHODOLOGY.....	42
3. Research Methodology.....	43
3.1. Methodology.....	43
3.2. Techniques used.....	45
3.2.1. Document analysis.....	46
3.2.2. Interviews with teachers.....	47
3.2.2.1. Interview script.....	51
3.2.3. Structured questionnaire.....	52
CHAPTER IV - PRESENTATION OF RESULTS.....	57
4. Presentation of Results.....	59
4.1. Document analysis.....	59
4.2. Interviews with teachers.....	60
4.3. Questionnaire.....	64
4.3.1. Results and Discussion.....	65
4.3.1.1. Part I – Socio-demographic and professional section.....	65
4.3.1.2. Part II – Use and efficiency of communication vehicles.....	72
4.3.1.3. Part III – Internal Communication.....	78
4.3.1.4. Hypothesis test.....	92
CHAPTER V - PROPOSAL OF A CONCEPTUAL FRAMEWORK OF INFORMATION SYSTEMS' SUCCESS MODEL OF INTERNAL COMMUNICATION.....	99
5. Introduction.....	101
5.1. Initial considerations.....	101
5.2. The dimensions of internal communication with teachers as internal stakeholders in Portuguese Public Schools.....	108
5.3. Model of internal communication with teachers, as internal stakeholders, in Portuguese Public Schools.....	111

CHAPTER VI - CONCLUSIONS	113
6.1. Discussion and Conclusions.....	115
6.2. Contribution of the study	119
6.3. Limitations of the study.....	121
6.4. Suggestions for future research	122
REFERENCES.....	123
APPENDICES	146
Appendix A – Questionnaire applied in Portuguese.....	147
Appendix B – English version of the questionnaire	161
Appendix C – Factor analysis with 29 questions.....	175
Appendix D – Interview script.....	177

LIST OF TABLES

TABLE II.1 – STUDIES ON THE SUCCESS OF INFORMATION SYSTEMS	21
TABLE II.2 – MOODLE DATA.....	33
TABLE II.3 – TEACHERS IN PRE-SCHOOL, ELEMENTARY, BASIC AND SECONDARY PUBLIC EDUCATION: TOTAL AND BY EDUCATIONAL LEVEL	39
TABLE II.4 – PRE-SCHOOL, ELEMENTARY, BASIC AND SECONDARY PUBLIC EDUCATION ESTABLISHMENTS BY EDUCATIONAL LEVEL.....	39
TABLE IV.1 – CHARACTERISATION OF THE INTERVIEWED TEACHERS.....	60
TABLE IV.2 – RESULTS OF INTERVIEWS WITH TEACHERS – COMMUNICATION VEHICLES..	62
TABLE IV.3 – RESULTS OF INTERVIEWS WITH TEACHERS – ROLE OF INTERNAL COMMUNICATION.....	62
TABLE IV.4 – RESULTS OF INTERVIEWS WITH TEACHERS – DEMOCRATISATION AND OPENING OF SCHOOL BOARD.....	63
TABLE IV.5 – RESULTS OF INTERVIEWS WITH TEACHERS – LEVELS OF SATISFACTION	63
TABLE IV.6 – RESULTS OF INTERVIEWS WITH TEACHERS – OTHER COMMENTS.....	64
TABLE IV.7 – NUMBER OF RESPONSES OF TEACHERS BY GENDER.....	65
TABLE IV.8 – NUMBER OF RESPONSES OF TEACHERS PER RECRUITMENT GROUP	67
TABLE IV.9 – NUMBER OF RESPONSES OF TEACHERS PER YEARS OF SERVICE	69
TABLE IV.10 – NUMBER OF RESPONSES OF TEACHERS PER EDUCATIONAL QUALIFICATIONS.....	70
TABLE IV.11 – NUMBER OF RESPONSES OF TEACHERS PER PROFESSIONAL SITUATION..	71
TABLE IV.12 – NUMBER OF RESPONSES OF TEACHERS PER FREQUENCY OF USE OF COMMUNICATION VEHICLES IN SCHOOL.....	73
TABLE IV.13 – NUMBER OF RESPONSES OF TEACHERS PER CLASSIFICATION OF THE EFFICIENCY OF COMMUNICATION VEHICLES IN SCHOOL	75
TABLE IV.14 – AVERAGE OF USE THE COMMUNICATION VEHICLES IN SCHOOL.....	77
TABLE IV.15 – AVERAGE OF EFFICIENCY OF COMMUNICATION VEHICLES IN SCHOOL	77

TABLE IV.16 – VARIABLES USED IN DATA PROCESSING	79
TABLE IV.19 – NUMBER OF TEACHERS’ RESPONSES CONCERNING THE MOODLE PLATFORM AS COMMUNICATION VEHICLE	82
TABLE IV.20 – NUMBER OF TEACHERS’ RESPONSES CONCERNING THE ACTIVE USE OF THE MOODLE PLATFORM.....	82
TABLE IV.21 – NUMBER OF TEACHERS’ RESPONSES CONCERNING COMMUNICATION VEHICLES	83
TABLE IV.22 – NUMBER OF TEACHERS’ RESPONSES CONCERNING THE ROLE OF INTERNAL COMMUNICATION.....	83
TABLE IV.23 – NUMBER OF TEACHERS’ RESPONSES CONCERNING THE LEVELS OF SATISFACTION.....	84
TABLE IV.24 – NUMBER TEACHERS’ RESPONSES CONCERNING DEMOCRATISATION AND OPENING OF THE SCHOOL BOARD	84
TABLE IV.25 – AVERAGE AND THE STANDARD DEVIATION OF THE 27 QUESTIONS	85
TABLE IV.26 – KMO AND BARTLETT’S TEST	86
TABLE IV.27 – TOTAL VARIANCE EXPLAINED	87
TABLE IV.28 – ROTATED COMPONENT MATRIX	88
TABLE IV.29- CRONBACH COEFFICIENT ALPHA OF ALL VARIABLES	89
TABLE IV.30 – CRONBACH COEFFICIENT ALPHA OF FACTOR 1	89
TABLE IV.31 – CRONBACH COEFFICIENT ALPHA WITH DELETED VARIABLES OF FACTOR 1	90
TABLE IV.32 – CRONBACH COEFFICIENT ALPHA OF FACTOR 2	90
TABLE IV.33 – CRONBACH COEFFICIENT ALPHA WITH DELETED VARIABLES OF FACTOR 2.....	90
TABLE IV.34 – CRONBACH COEFFICIENT ALPHA OF FACTOR 3	90
TABLE IV.35 – CRONBACH COEFFICIENT ALPHA WITH DELETED VARIABLES OF FACTOR 3.....	91
TABLE IV.36 – CRONBACH COEFFICIENT ALPHA OF FACTOR 4	91

TABLE IV.37 – CRONBACH COEFFICIENT ALPHA WITH DELETED VARIABLES OF FACTOR 4.....	91
TABLE IV.38 – CRONBACH COEFFICIENT ALPHA OF FACTOR 5	91
TABLE IV.39 – CRONBACH COEFFICIENT ALPHA WITH DELETED VARIABLES OF FACTOR 5.....	92
TABLE IV.40 – CRONBACH COEFFICIENT ALPHA OF FACTOR 6	92
TABLE IV.41 – CRONBACH COEFFICIENT ALPHA WITH DELETED VARIABLES OF FACTOR 6.....	92
TABLE IV.42 – T-TEST	93
TABLE V.1 – MEASURES OF INFORMATION QUALITY	102
TABLE V.2 – MEASURES OF SYSTEM QUALITY	102
TABLE V.3 – MEASURES OF INTENT TO USE	103
TABLE V.4 – MEASURES OF USER SATISFACTION.....	103
TABLE V.5 – DIMENSION, ITEMS, DESIGNATION USED IN FRAMEWORK.....	104
TABLE V.6 – AVERAGE OF QUESTIONS OF THE INFORMATION QUALITY DIMENSION	105
TABLE V.7 – AVERAGE OF QUESTIONS OF THE SYSTEM QUALITY DIMENSION	107
TABLE 0.1 - INTERVIEW GUIDE TO TEACHERS	177

LIST OF GRAPHS

GRAPH IV.I – NUMBER OF RESPONSES IN PERCENTAGE OF TEACHERS PER RECRUITMENT GROUP	68
GRAPH IV.II – NUMBER OF RESPONSES IN PERCENTAGE OF TEACHERS PER YEARS OF SERVICE.....	70
GRAPH IV.III – NUMBER OF RESPONSES IN PERCENTAGE OF TEACHERS PER EDUCATIONAL QUALIFICATIONS	71
GRAPH IV.IV – NUMBER OF RESPONSES IN PERCENTAGE OF TEACHERS PER PROFESSIONAL SITUATION	72
GRAPH IV.V – NUMBER OF RESPONSES IN PERCENTAGE OF TEACHERS PER FREQUENCY OF USE OF COMMUNICATION VEHICLES IN SCHOOL	74
GRAPH IV.VI – NUMBER OF RESPONSES IN PERCENTAGE OF TEACHERS PER CLASSIFICATION OF THE EFFICIENCY OF COMMUNICATION VEHICLES IN SCHOOL	76
GRAPH V.I – AVERAGE OF QUESTIONS OF THE INFORMATION QUALITY DIMENSION	106
GRAPH V.II – AVERAGE OF QUESTIONS OF THE SYSTEM QUALITY DIMENSION	108

LIST OF FIGURES

FIGURE I.1 – SCHEME OF INVESTIGATION FOR THE RESEARCH STUDY.....	9
FIGURE II.1 – THE INFORMATION SYSTEMS CYCLE	16
FIGURE II.2 – DELONE AND MCLEAN’S INFORMATION SYSTEM SUCCESS MODEL.....	17
FIGURE II.3 – DELONE AND MCLEAN’S INFORMATION SYSTEM SUCCESS MODEL.....	19
FIGURE III.1 – TECHNIQUES USED	45
FIGURE IV.1 – COMMUNICATION VEHICLES IN PORTUGUESE PUBLIC SCHOOLS	59
FIGURE IV.2 – SCHEME OF THE CATEGORIES USED IN THE INTERVIEWS WITH TEACHERS	61
FIGURE IV.3 – AGE DISTRIBUTION OF TEACHERS	66
FIGURE V.1 – MODEL OF INTERNAL COMMUNICATION BASED ON THE DELONE AND MCLEAN’S (2003) MODEL, WITH TEACHERS AS INTERNAL STAKEHOLDER, IN PORTUGUESE PUBLIC SCHOOLS	112

LIST OF ACRONYMS

CFA – Confirmatory Factor Analysis

EFA – Exploratory Factor Analysis

HOT-Fit – Human, Organisation, and Technology-Fit

IS – Information Systems

LMS – Learning Management System

Moodle – Modular Object-Oriented Dynamic Learning Environment

SCP – Social Constructionist Pedagogy

SPSS – Statistical Package for the Social Sciences

UDISE – Unified District Information System for Education

UTAUT – Unified Theory of Acceptance and Use of Technology

VLE – Virtual Learning Environment

CHAPTER I – INTRODUCTION

1.1. Introduction

The use of Information Systems (IS) has increased over the last decade across application architecture, not only in private business enterprises, but also in public and government enterprises; thus, the information systems success model can be considered in all contexts (Sirsat & Sirsat, 2016).

Organisations implement information systems to improve employee productivity and engender favourable organisational outcomes (Bala & Bhagwatwar, 2017) and a solid IS. One that is generally accepted by its users and proves to be successful can determine the success of a business (Isaias & Issa, 2015).

IS have a key role in organisations. Through them, a manager can easily access the information on all aspects of the organisation, hence the growing importance of IS to support business operation (Ali et al., 2013). Furthermore, it has been used in almost all aspects of human society, such as in the military, health sciences, telecommunication and e-commerce fields, among others (Alotaibi & Liu, 2012).

The correct management of this information is critical for the success of an organisation, insofar that, based on it, executives can decide the direction of the organisation. It is evident from the literature that IS's evaluation is a complex task, because of their multi-faceted nature (Peffer & Saarinen, 2002; Stair & Reynolds, 2008).

There is no consensus regarding which is the best model. However, it has been argued that IS is not the solution, but their utilisation provides competitive advantages (Zaied, 2012). The importance of user satisfaction in the success of IS has been recognised as the most indicated factor by many researchers and practitioners (Ong & Lai, 2005).

Therefore, the literature presents a series of models developed to assess IS. Some studies that are regularly cited by researchers (Isaias & Issa, 2015) are: Bailey and Pearson (1983), Ives, Olson and Baroudi (1983), Davis (1989), Baroudi and Orlikowski (1988), Goodhue (1995), Torkzadeh and Doll (1999), and DeLone and McLean (1992, 2003).

The DeLone and McLean's model has been considered as the most comprehensive IS assessment instrument (Petter & McLean, 2009; Urbach et al., 2008).

According to Wu and Wang (2006), among the various approaches using user satisfaction for IS assessment, the DeLone and McLean's (1992, 2003) model is considered one of the most comprehensive ones, resulting from the consolidation of the major studies on success of IS.

Consequently, this study aims to use the model developed by DeLone and McLean (2003), which proposes the quality of systems and the quality of information effects of natural and, jointly, usability and user satisfaction.

IS in organisations are a critical factor for success because they improve operations' efficiency and effectiveness; therefore, Portuguese Public Schools are no exception to this reality. Educational institutions are influenced by the societal events constantly occurring around them (Hargreaves, 1995). According to Seddon (1997), IS success is conceptualised as a value judgment made by an individual, from the stakeholder's point of view.

All relationships are created, shaped and nurtured with communication (Yang, Shen, Drew, & Ho, 2010). Communication plays a very important role in business, which includes different kinds of relationships among people and organisations (Tankosic, Ivetic, & Mikelic, 2017). As a result, organisational communication emerges simultaneously as a social, economic and political requirement for any organisation.

Internal communication is a demanding issue for the communication practice, as organisations strive to achieve employee engagement and organisational effectiveness, which is an important research field (Welch, 2013).

Consequently, job engagement mediates the relationship between employee communication and organisational commitment. Therefore, to foster engagement, organisations should remove obstacles to the internal information flow and provide ongoing feedback to employees about individual and organisational issues (Walden, Jung, & Westerman, 2017).

In order to achieve sustainable organisations, we should acknowledge the role of communication and mutual understanding as a sustainable communication, focused on people (Godemann & Michelsen, 2011). Organisations aim to communicate the same message to all their stakeholders, to convey coherence, credibility and ethics (Tankosic et al., 2017), and correctly assess stakeholder salience by paying particular attention to their power, legitimacy and urgency (Pérez, López, & García-De los Salmones, 2017).

Organisational internal communication should allow stakeholders to contribute with ideas, suggestions and opinions, through dialogues, e-mail messages, meetings and any other forms of communication within the organisation.

It is essential to establish good communication channels with the involved stakeholders, both internally and externally, by setting clear communication goals, keeping an active involvement, and being persistent (Manowong & Ogunlana, 2010). Indeed, internal communication has also the function of allowing the employees' involvement in the organisation's goals and priorities, which adds to the reduction of their frustration and dissatisfaction (McKenna, 2006).

This is also true when we talk about educational organisations, particularly Portuguese Public Schools, for which communication is an “instrument” that allows them to continue living in their environment. Internal communication contributes to the success of interaction between the school and its internal stakeholders. This tool also balances the interests of both the school and stakeholders, by encouraging dialogue and exchange of information, at all levels.

A widely used tool in virtual communities is Moodle (Parra, 2017); thus, the use and management of the Moodle Platform in schools is a useful tool due to its user friendliness, low cost and effectiveness (Peraya, 2000), which can significantly influence the performance of the organisation, given that it allows to communicate, develop and maintain a stable and sustainable relationship with its internal stakeholders. In this way, the Moodle Platform is a tool that allows an active and dynamic internal communication with internal stakeholders.

The Moodle Platform emerges as a tool that allows schools to promote the construction and sharing of ideas, building knowledge among the school's internal

stakeholders. As referred by Bourne (2009), the relationship with stakeholders is an important action that can contribute to the success or failure in organisations.

Internal communication allows the involvement of employees on the goals of the organisation, so that they do not feel frustrated and disappointed because they are not aware of the organisation's goals and priorities (McKenna, 2006). Therefore, good communication becomes the building block of partnership relationships with employees (Rajhans, 2012).

The use of the Moodle Platform allows good communication with internal stakeholders. As referred by Miranda et al. (2008), the use of Moodle enables the implementation of a project; whatever its stage of development, there may be a need to solve problems remotely or simply to share ideas and common practices. Holtz (2004) also posits that the purpose of internal communication is to exert influence; the organisation has goals, and leaders need employees to focus their energy and efforts in the kind of work that helps the company achieve these goals.

Therefore, nowadays IS, school administration, the Moodle Platform, the relationship with stakeholders and internal communication are seen as competitive differentiators for improvements in information flow and knowledge dissemination in schools.

In a first phase, this study seeks to know the opinion/understanding of teachers, as internal stakeholders, in Portuguese Public Schools, in the context of internal communication in the following areas: role of internal communication, communication vehicles, levels of satisfaction, democratisation and opening of the school board and the Moodle Platform as communication vehicle.

Finally, this study proposes a new IS success model based on the DeLone and McLean's (2003) model, which allows to know the satisfaction of internal stakeholders in Portuguese Public Schools, in the context of internal communication using Moodle as communication tool.

1.2. Objectives of the Study

The main objective of the study is to present a proposal for an IS success model of internal communication based on the DeLone and Mclean's (2003) model, with teachers as internal stakeholders, in Portuguese Public Schools.

The specific objectives of this study are to:

- Study the role of IS;
- Review the DeLone and McLean's (2003) model and the empirical studies that have been built on the basis of this model;
- Study the DeLone and McLean's (2003) model applied to Educational Organisations;
- Study the internal organisational communication;
- Understand the importance of internal communication with internal stakeholders;
- Study the Moodle Platform as communication tool;
- Make a characterisation of Portuguese Public Schools as organisations;
- Gather data from Portuguese Public Schools and use a mixed methods research;
- Present of results and analyse the data of the study, and validate the hypotheses formulated;
- Contribute to the development of the understanding of IS in Portuguese Public Schools, through the proposal of an IS success model of internal communication based on the DeLone and Mclean's (2003) model, with teachers (as internal stakeholders), in Portuguese Public Schools.

1.3. Research Questions

This investigation has one general research question and five specific questions:

The general question is:

- What are the dimensions that an IS success model of internal communication must have to communicate with teachers, as internal stakeholders, in Portuguese Public Schools?

The specific questions are the following:

- Does the role of internal communication positively influence the degree of involvement and participation of teachers, as internal stakeholders, in Portuguese Public Schools?
- Is it important for teachers, as internal stakeholders, that the school board has an open and democratic stance about communication in Portuguese Public Schools?
- Is it important for teachers, as internal stakeholders, that communication vehicles have a good organisation in Portuguese Public Schools?
- Do the levels of satisfaction of teachers, as internal stakeholders, increase as the levels of communication and circulation of information also increases?
- Does the use of the Moodle Platform as a communication tool positively influence the communication with teachers, as internal stakeholders, in Portuguese Public Schools?

1.4. Research Hypotheses

This study aims at assessing the following research hypotheses:

- **Hypothesis 1:** In Portuguese Public Schools, teachers, as internal stakeholders, agree that the role of internal communication positively influences their degree of involvement and participation.
- **Hypothesis 2:** In Portuguese Public Schools, teachers, as internal stakeholders, agree that the school board has an attitude of openness and democratic stance about communication.
- **Hypothesis 3:** In Portuguese Public Schools, teachers, as internal stakeholders, agree that there is a good organisation of communication vehicles.
- **Hypothesis 4:** In Portuguese Public Schools, the levels of satisfaction of teachers, as internal stakeholders, increase as the levels of communication and circulation of information also increases.
- **Hypothesis 5:** In Portuguese Public Schools, the use of the Moodle Platform as a communication tool will positively influence the communication with teachers, as internal stakeholders.

1.5. Scheme of investigation for the research work

The research process used in study, as can be observed in Figure I.1 – Scheme of investigation for the research , encompassed the following phases:

- In a first phase the theoretical study was carried out at two levels:
 - Review of the literature on the following topics: the Role of Information Systems; the DeLone and McLean’s Information System success model; the DeLone and McLean’s Model applied to Educational Organisations; Internal Organisational Communication; the Importance of Internal

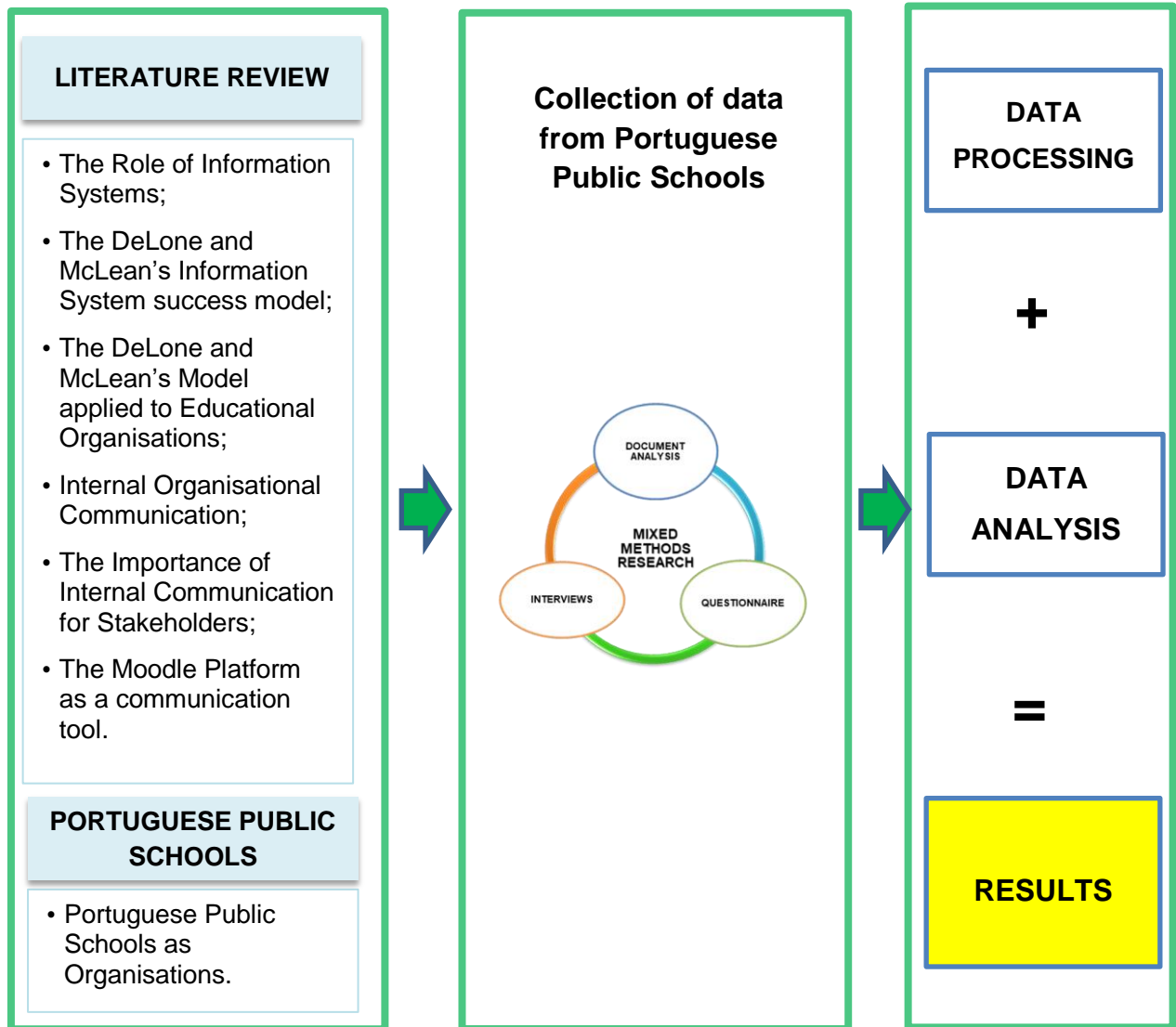
Communication for Stakeholders; and the Moodle Platform as a communication tool.

- Study of Portuguese Public Schools as Organisations.
- The following phase involved the collection of data from Portuguese Public Schools. The data collection techniques used were: (i) document analysis; (ii) interviews with teachers; and (iii) a questionnaire applied to teachers.
- Subsequently, the results that emerged from the joint process of data collection and data analysis were analysed.
- Finally, an information systems' model of internal communication, based on the Delone and Mclean's (2003) model, with teachers (as internal stakeholders), in Portuguese Public Schools, was proposed.
- The research process described above, as well as its results, aim to add knowledge to the existing body of knowledge on this topic.

Figure I.1 presents the Scheme of investigation for the research study.

Figure I.1 – Scheme of investigation for the research study

Scheme of investigation for the research work



ADD KNOWLEDGE

PROPOSAL OF AN INFORMATION SYSTEMS’ MODEL OF INTERNAL COMMUNICATION BASED ON THE DELONE AND MCLEAN’S (2003) MODEL, WITH TEACHERS (AS INTERNAL STAKEHOLDERS) IN PORTUGUESE PUBLIC SCHOOLS.

1.6. Structure of the thesis

This work is organised into the following chapters:

- **Chapter I: Introduction**

This chapter contains the introduction of the study, the objectives of study, the research hypotheses, the scheme of investigation for the research study, and the structure of the thesis.

- **Chapter II: Literature Review**

In this chapter the bibliographical research with regard to the main topics of this study is presented.

- **Chapter III: Research Methodology**

This chapter focuses on the research methodology used in the study, including the research design and the instruments used for data collection.

- **Chapter IV: Presentation of Results**

Data collected from the teachers surveyed is analysed using different statistical techniques. This chapter includes the hypotheses test.

- **Chapter V: Proposal of a conceptual framework of an information systems' success model of internal communication**

Firstly, this chapter explains basic considerations and the dimensions of internal communication with teachers, as internal stakeholders, in Portuguese Public Schools. Subsequently, a proposal of a conceptual framework of an information systems' success model of internal communication is put forward.

- **Chapter VI: Conclusions**

This chapter presents, firstly, the main conclusions of the whole study, followed by the contributions of the study, the limitations of the study and suggestions for future research.

CHAPTER II - Literature Review

2. Literature Review

This chapter presents the literature review carried out on the central topics of this research, specifically: the Role of Information Systems; the DeLone and McLean's Information System success model; Applying DeLone and McLean's Model to Educational Organisations; Internal Organisational Communication; the Importance of Internal Communication for Stakeholders; the Moodle Platform as a Communication Tool; and Public Schools as Organisations.

2.1. The role of Information Systems

IS have grown to become an essential component of organisational management (Isaias & Issa, 2015) and play a vital role in any organisation because they have, as main functions, among others, the management of the functioning of information, the coordination of activities between departments, and the interaction and contribution to the efficiency of the fundamental functions of the organisation (Laudon & Laudon, 2001; Tripathi, 2011). Moreover, they are crucial for the enhancement of business performance.

IS are a dynamic and complex accomplishment of everyday practices, to which they add core contributions, particularly in regard to strategizing activities that account for the tensions at play in exploiting existing assets and resources (planned strategy), while exploring new ways to gain and maintain a differential advantage, through improvisation, flexibility, informality and communication/collaboration practices (emerging strategy) (Marabelli & Galliers, 2017).

The use of IS in business has expanded significantly over the years. Until the 1960s and 1970s, the role of IS was simple processing, record keeping, accounting, and other data processing application (O'Brien & Marakas, 2011).

Between 1980 and 1990, IS started taking on an important role and became a strategic concept, sometimes named strategic IS. Hence, IS became an integral

part of business processes, products and services that help organisations win competitive advantage (Laudon & Laudon, 2012).

In the end of the twentieth century and nowadays, IS have become crucial to the functioning of modern organisations and businesses. Regardless of their size, IS are playing an increasingly important role in organisations of all types (Peppard & Ward, 2004). IS are often defined as

[...] an integrated, user-machine system for providing information to support operations, management, and decision-making functions in an organization. The system utilizes computer hardware and software; manual procedures; models for analysis, planning, control and decision making; and a database.

(Davis & Olson, 1984: 6)

According to Thompson and Strickland (2003), IS are one of the tools that help organisations increase efficiency and productivity in order to achieve their goals, and is progressively providing a competitive advantage for organisations, in addition to more traditional systems, which assist in the day-to-day business operations.

Therefore, Ordanini and Rubera (2010) note two approaches: the first is that IS indirectly impact business performance through several key business features, such as flexibility; the second approach is that IS directly enable business performance.

Several studies have found and reported that the purpose of an IS is to support decision making in an organisation and to enhance organisational efficiency, quality, and productivity (Davis & Olson, 1985). Furthermore, the dependency of business on IS in daily operations suggests that organisations need to pay more attention to IS planning, which aims to facilitate the achievement of the organisation's business goals (Basu et al., 2002).

Atkinson et al. (2011) refer that decision making is a complex process, involving many variables and critical managerial functions that often decide the destiny of organisations.

Today, making good decisions is not sufficient. The organisation must also make them quickly, which often requires IS that can provide data, information and answers to questions, so that managers can decide (Snyder, 2010). Consequently, decision making means recognising problems, creating different solutions to the problems, choosing among alternatives and implementing the chosen alternative (McKeown, 2002).

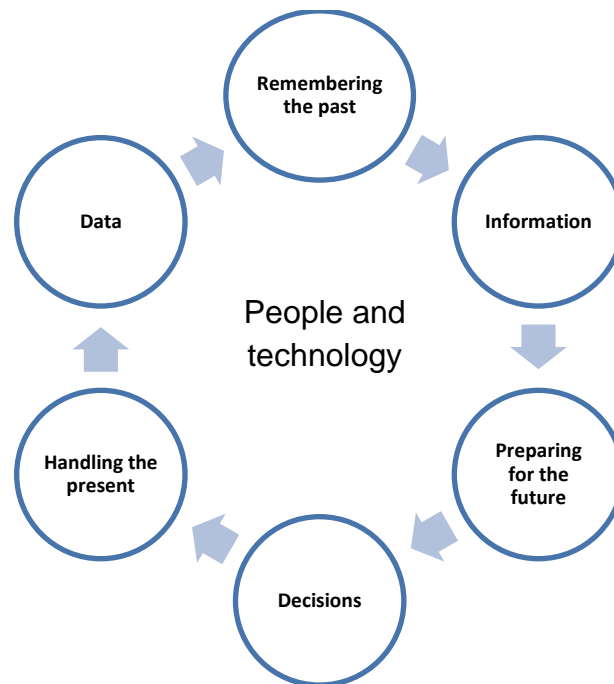
Also associated with IS is the use of technologies in organisations. As referred by Dutton (1999), information technology has, in recent years, reshaped lives, businesses and organisations.

According to Turban and Volonino (2011), the Internet, intranets and extranets, among others, interconnected global networks in a global environment, which changed the abilities of IS in business, and so, technology is playing a critical role in business.

In the context of traditional industries, the increase in efficiency and productivity, as well as the subsequent reduction of costs brought by information technology, are leading to the creation of new products, services and distribution channels.

Improved availability of information, productivity, quality of work, effectiveness and efficiency in accomplishing tasks is often associated with greater use of these technologies in organisations (Wallace, 2012).

Consequently, IS are the means by which organisations and people, using information technologies, gather, process, store, use and disseminate information (Bocij et al., 2008), and are used in organisations for three purposes or functions: handling the present, remembering the past and preparing for the future (McKeown, 2009) (see Figure II.1 – The information systems cycle).

Figure II.1 – The information systems cycle

Source: McKeown (2009).

It may be concluded, therefore, that IS cannot be ignored by managers because they play a critical role in contemporary organisations, i.e., they play a strategic role in the life of the organisation. IS perform, in any type of organisation, the following essential/fundamental roles: support of business operations, support of managerial decision-making and support of strategic competitive advantage.

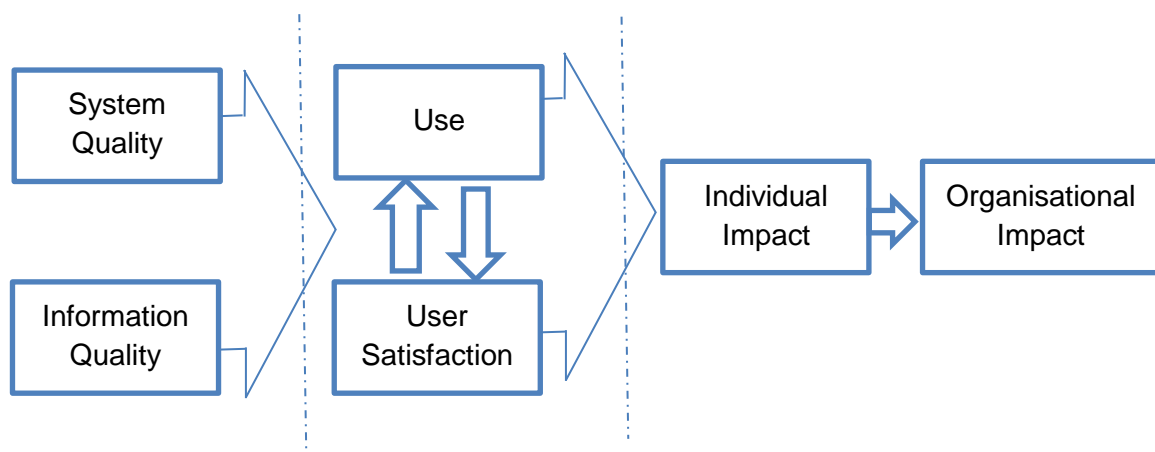
2.2. DeLone and McLean's Information System success model

Early attempts to define IS success had difficulty in handling the complex, interdependent, and multi-dimensional nature of IS success. To address this problem, DeLone and McLean (1992) performed a review of the research published during the period from 1981 to 1987, and created a taxonomy of IS success based on this review (Petter, DeLone & McLean, 2008).

Therefore, the variety of measures used in prior studies led the authors to try and obtain a simpler pattern or patterns of measures by compiling existing studies and evaluating the measures used in them (Isaias & Issa, 2015).

DeLone and McLean synthesised various studies in 1992 (Wong & Ph, 2011). In their 1992 paper, the DeLone and McLean's theory of IS success, as illustrated in , was an attempt to prescribe a single theory of IS success. It consisted of six constructs: system quality, information quality, use, user satisfaction, individual impact and organisational impact. Constructs are a high-level description of the system that is being built; and are used for modelling the structure of business processes.

Figure II.2 – DeLone and McLean's Information System Success Model



Source: DeLone and McLean (1992).

The theory was based on the insights by Shannon and Weaver (1949) and Mason (1978). The arrows indicate a causal relationship and are directions of influence. According to Shannon and Weaver (1949), as well as Mason (1978), problems are present in three hierarchical levels: a technical level, a semantic level and an effectiveness level.

Their model proposed six interrelated variables to measure the success of IS, including: system quality, information quality, system's use, user satisfaction, organisational impact, and individual impact (Zaied, 2012).

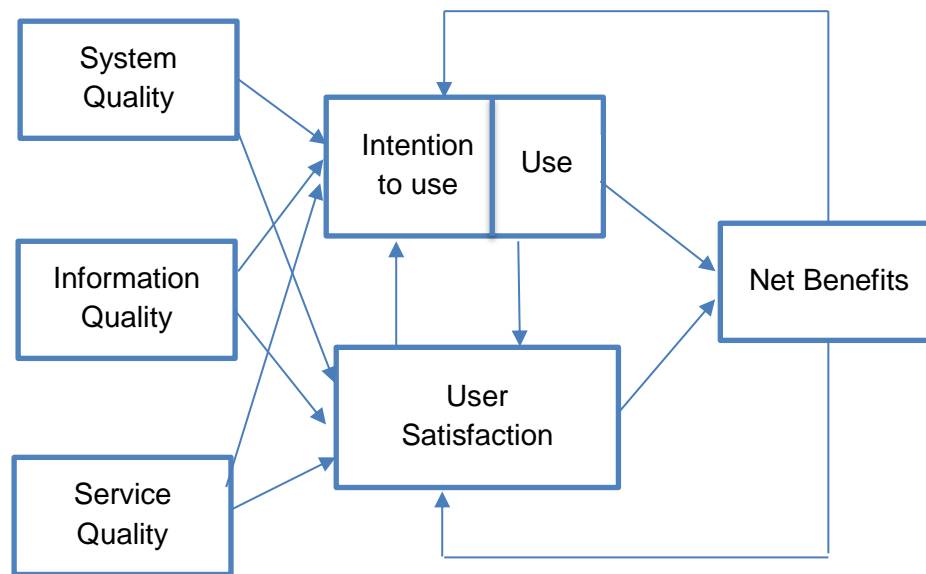
Shortly after the publication of the DeLone and McLean's success model, IS researchers began proposing modifications to this model, accepting what the authors call for further development and validation. Many studies have been conducted to determine the success of IS. These research studies have identified dependent variables based on various factors.

The model has remained to receive a wider acceptance over the decade (Almutairi & Subramanian, 2005; DeLone & McLean, 1992; Gable, Sedera, & Chan, 2008; Petter & McLean, 2009). Over the years, the DeLone and McLean's model of IS success has been redesigned and tested in many different areas of intervention of society.

Ten years after the publication of their first model, and based on the evaluation of the many contributions to it, DeLone and McLean proposed an updated IS success model, as illustrated in Figure II.3 – DeLone and McLean's Information System Success Model

Between 1993 to 2002, more than 200 papers have referenced the DeLone and McLean's model, henceforth stated as DeLone and McLean, for the factors contributing to IS success in acclaimed journals (Wong & Ph, 2011). The main differences between the original and the updated models are:

- The addition of service quality to reflect the importance of service and support in successful e-commerce systems and the addition of intention to use to measure user attitude as an alternative measure of use;
- The collapsing of individual impact and organisational impact into net benefits.

Figure II.3 – DeLone and McLean’s Information System Success Model

Source: DeLone and McLean’s (2003)

The updated model, as illustrated in Figure II.3 – DeLone and McLean’s Information System Success Model, consists of six interrelated dimensions of success (DeLone & McLean, 2003):

- *System Quality* constitutes the required characteristics of an IS and, thus, subsumes measures of the IS itself.
- *Information Quality* constitutes the desirable characteristics of an IS output.
- *Service Quality* represents the quality of the support that the users receive from the IS department and information technology support personnel.
- *Intention to Use/Use* accounts for the degree and manner in which an IS is utilised by its users.
- *User Satisfaction* constitutes the user’s level of satisfaction when utilising an IS.
- *Net Benefits* constitutes the extent to which IS are contributing to the success of the different stakeholders.

As mentioned, DeLone and McLean (2003) proposed an updated IS success model, based on the evaluation of the many contributions. A number of

researchers claim that the model is incomplete; consequently, they suggest that more dimensions should be included in the model (Seddon, 1997; Seddon & Kiew, 1994). Other researchers focus on the application and validation of the model (Rai, Lang, & Welker, 2002).

Seddon (1997) presented and justified a re-specified and extended version of the DeLone and McLean's model of IS success by splitting it into two variance sub models (of use and success) and eliminating the process model interpretation.

Myers, Kappelman and Prybutok (1997) conducted a study on organisational performance based on the DeLone and McLean's (1992) model and modified the original model by including the dimensions of service quality and impact of work group. According to these authors, the new model adds more elements to the success of IS measures of organisational performance.

In 1995, so as to address this lack of focus on services, Pitt, Watson and Kavan (1995) added the category Quality of Service to the DeLone and McLean's model. Moreover, Seddon et al. (1999) modified the DeLone and McLean's theory (1992). The major difference between the two theories is the definition and placement of IS use.

Hunton and Flowers (1997) and Seddon and Kiew (1994) found support for the relationships of the DeLone and McLean's theory at the time.

Smithson and Hirschheim (1998) re-examined the issue of IS evaluation in the light of recent developments in the field. They argued that IS evaluation is a 'necessary evil', but the context in which IS are developed and used has become much more demanding and complex.

In 1999, Wilkin and Hewett (1999) redesigned the original DeLone and McLean's model, proposing a quantitative tool to measure the success of IS.

Jennex and Olfman (2004) present a success model based on the DeLone and McLean's (DeLone & McLean, 1992, 2003) Information Systems Success Model. This model evaluates success as an improvement in organisational effectiveness based on use of and impacts from the Knowledge Management Systems.

Maier (2002) also proposes a success model based on the DeLone and McLean's Information Systems Success Model (DeLone & McLean, 1992). This model is similar to the Jennex and Olfman's model. Breakdown of the dimensions into constructs is not provided, but specific measures for each dimension are identified.

The DeLone and McLean's model, either the first version or the updated one, has become frequently used for the evaluation framework in IS research, in the more varied areas, over the last years.

In conclusion, DeLone and McLean encourage other researchers to further develop the model and help to continue its evolution.

Table II.1 – Studies on the success of information systems

Type of information system	Authors
Data warehouse	- Wixom & Todd (2005) - Nelson, Todd, & Wixom (2005)
E-Commerce system	- DeLone & McLean (2004) - Molla & Licker (2001) - Wang (2008)
Finance and accounting system	- Livari (2005)
Intranet	- Trkman & Trkman (2009) - Masrek et al. (2007)
Online community	- Lin & Lee (2006)
Knowledge management system	- Kulkarni, Ravindran, & Freeze (2006) - Clay et al. (2005) - Wu & Wang (2006) - Velasquez et al. (2009)
Website	- McKinney, Kanghyun, & Zahedi (2002) - Schaupp et al. (2006) - Zviran, Glezer, & Avni (2006).
E-learning	- Holsapple & Lee-Post (2006) - Lin (2007) - Wang et al. (2007)

Source: Own elaboration.

Applying the DeLone and McLean's Model to Educational Organisations

Researchers have grown more and more interested in establishing IS development methodologies and models that can be used across a wide range of contexts, with the purpose of finding ordered, systemic frameworks among the immense variety of techniques and methods that can be found in practice (Isaias & Issa, 2015).

Therefore, a number of studies may be found in literature on the application of the DeLone and McLean's model in different arenas. One of these is the model's application in educational organisations.

A paper from 2016 focused on a review of the DeLone and McLean's evaluation model, a comparative analysis of the original and the updated model, and the validation of information success of the Indian government UDISE (Unified District Information System for Education) system applying the same model (Sirsat & Sirsat, 2016). In this paper, the authors have successfully validated the model in the government of the Maharashtra's system. It looks that the UDISE system is successful about system quality, information quality, and service quality based on the analysis. Results of the study are satisfactory regarding the DeLone and Mclean's model and respondents, as they feel system quality information generated through UDISE is useful and easy to understand (Sirsat & Sirsat, 2016).

So as to identify the factors that influence the success and acceptance of e-learning systems in higher education, Putu Ramayasa (2015) proposed an integrated evaluation model using the DeLone and McLean's Information System Success Model, the UTAUT (Unified Theory of Acceptance and Use of Technology) Model, and the HOT-Fit (Human, Organisation, and Technology-Fit) Model. This research is relevant for the knowledge of the success and acceptance of e-learning in higher education, in order to be able to be evaluated. Results of this study described the factors that influence the success of IS and user acceptance of the e-learning system, and described the correspondence between

man, technology and organisation to the e-learning respondent users, in order to know the success and acceptance of e-learning in higher education.

A survey evaluated the associations between system quality, information quality, and service quality on student satisfaction and use of systems in virtual learning environments using the e-learning success model adapted by Holsapple and Lee-Post from the DeLone and McLean's (1992, 2003) model as a theoretical basis (Silva, Meirelles, Filenga, & Filho, 2014). The survey was carried out by means of an online programme offered to 291 students from public and private institutions from several regions of Brazil. This study evaluated the antecedents of student satisfaction and use of systems in a virtual learning environment and showed the degree of importance of the dependent variables. The results indicate that Information Quality had the greatest impact on Satisfaction and Use, followed by Service Quality and System Quality.

A study based on the DeLone & McLean's model as a theoretical foundation investigated the factors that have successfully influenced the learning management system among undergraduate students in Limkokwing University of Creative Technology, in Malaysia (Salem & Salem, 2015) . This model can be used to assess the success of LMS (Learning Management System) due to solid theoretical foundation and the numerous successful empirical studies.

The Internet has dramatically influenced the introduction of virtual education. Virtual education is a term that involves online education and e-learning. A study carried out in 2017 aimed to evaluate a virtual education system based on the DeLone and McLean's model. According to the results, system quality has the greatest overall impact on net benefits through both the direct and indirect paths by affecting user satisfaction and intention to use. The continued use of virtual education systems and the more efficient use of these systems requires, therefore, special attention regarding system quality, which involves speed of data transfer, ease of access, system authenticity, responsiveness, flexibility and user-friendliness (Mahmoodi et al., 2017).

Another study conducted in 2014 presents the principles of the DeLone and Mclean's success model applied to the Kano two-dimensional model, for

categorising quality attributes related to satisfaction of students with a web based learning system used in a blended learning model, providing in such manner the recommendations for creating better new teaching/learning systems (Bauk, Šćepanović, & Kopp, 2014). The population sampled was composed of students from the “Mediterranean” University (in Montenegro). In this study, the (dis)functional dimensions of the Kano’s model, including Kano’s basic matrix for assessment of the degree of the students’ satisfaction level, have been considered in some more detail through corresponding numerical, graphical, and statistical analysis.

Within the scope of the LMS field, a study was deployed in Higher Education Institutions in Sub-Saharan countries by adopting and extending the updated DeLone and McLean’s Information System Success Model. It was found that all six constructs were significant (Mtebe & Raisamo, 2014). This study proposed a model and the instrument has been validated through a survey of 200 students enrolled in various courses offered via Moodle LMS at the University of Dar es Salaam, in Tanzania.

2.3. Internal Organisational Communication

Internal communication is crucial for efficient work in any organisation, and it is becoming a source of competitive advantage (Tankosic et al., 2017). Moreover, internal communication in an organisation includes internal relationships, employee communication, employee relationships, internal public relationships, staff communication, organisational communication and corporate/business communication (García-Morales, Matías-Reche, & Verdú-Jover, 2011). As a result, developing positive employee attitudes, such as positive organisation-employee relationships and favourable employee communication behaviour, ascribes internal communication a vital role (Kim & Rhee, 2011).

Nowadays, commitment within the organisation is important, because the organisation must work to nurture, maintain and grow engagement, which requires

a two-way relationship between employer and employee, leading to a positive attitude held by the employee towards the organisation and its values (Robinson & Hayday, 2009).

In this context, knowing how to communicate properly with employees is a competitive advantage for any organisation. Most employees cannot progress in the organisations where they work because they feel frustrated and unsatisfied, in part because they are not aware of the organisation's goals and priorities. This happens when there is no commitment with internal communication about the aims of the organisation for its employees. It is necessary to develop a clear line between the organisation and employees, not only to improve employees' performance, but also for the success of the organisation. There must be an effort towards direct communication about the aims of the organisation, as well as about the role of each employee (i.e., there must be a "commitment to communicate") (McKenna, 2006).

Garcia-Morales et al. (2011) refer that two-way communication increases the chance that members of an organisation will be satisfied with their individual jobs and with the organisation as a whole, which means that, nowadays, it is commonly agreed that two-way communication is important for successful internal communication.

In internal communication, having responsibility, awareness, professionalism and sincerity results in improved interaction, greater trust, greater understanding, enhanced efficiency, better performance, and higher gratification (Marques, 2010).

Internal organisational communication is a process through which the members of the organisation get relevant information about the organisation and the changes that take place. Internal organisational communication plays a function of gathering information for members of the organisation (Kreps, 1990). Internal communication varies from office gossip and informal chat to formal corporate communication to all employees (Welch, 2013).

It is necessary to create a good environment, in organisations, for internal communication, since freedom of expression is essential in order for creativity and innovation to exist in the workplace. Open communication in the workplace has

seven distinct characteristics (Saunders, 2007): employees are valued; there is a high level of trust; creative disagreement is welcomed; all employees are asked to participate; employees are well informed through formal channels; feedback is ongoing; and conflicts are resolved positively. Conflict itself is not good or bad – it is just inevitable, being essential the use of dialogue with employees. In this context, the performance in an organisation has an effect on both its informal and formal elements, because it generates patterns of interaction through which organisational actors coordinate effort, share goals, exchange information and access resources (Soda & Zaheer, 2012).

Andrews & Herschel (1996) reported that internal communication involves the interpretation and negotiation of messages, trying to articulate and bring mutual understanding of the organisation's visions, purposes and goals among its employees.

The role of the persons responsible for the communication process should be to support action in accordance with the principles of openness and accountability, in order to build trust among employees. Employee involvement should be treated as the end result of communication activities undertaken, thus ensuring continuity of business operations. Organisation's communication cannot be treated as an end in itself; rather, there should become current and future involvement of employees built by communication (Rajhans, 2012).

Genelot (2001) refers that internal communication is the driver of a common strategy – the strategy of the organisation and the communication strategy as a single act. For this reason, it is necessary to acknowledge, once and for all, the symbolic level in which events are processed, so as to distinguish and understand how these levels occur in the organisational arena.

Internal communication is vital for organisational management and success; furthermore, it is an essential part of the organisation, in the sense that communication is the organisation, and, thus, it is a necessary condition of the organisation (Argenti, 2009; Lite, 1997). Internal communication is a multifaceted phenomenon happening within the organisation, positing it as a structural and constitutive component of the organisation (Cooren et al., 2011).

Therefore, internal communication is an essential factor for the sound functioning of organisations and a competitive advantage, because it develops positive employee attitudes, such as positive organisation-employee relationships and a favourable employee communication behaviour. That is why internal communication plays a vital role (J. Kim & Rhee, 2011).

2.4. The Importance of Internal Communication for Stakeholders

Stakeholder management is seen as a key factor for the development of success (Manowong & Ogunlana, 2010). A well-developed communication and a good relationship with the internal public are important factors for the organisation to cooperate with the perception of its public, so that it, in its job prospects, may perceive potential problems to be faced by the organisation (Fearn-Banks, 2011).

Internal and external communication is a set of activities involved in managing and orchestrating all internal and external communications aimed at creating favourable points of view among stakeholders on whom the company depends (Tankosic et al., 2017).

Freeman and Reed (1983) proposed the concept of stakeholder, originally used by the Stanford Research Institute in 1963, with the following meaning: stakeholder is any individual or group that can influence the achievement of organisational objectives, or is influenced by the attainment of these objectives. A stakeholder is any individual or group of people who can influence or be influenced by the organisation – customers, users, employees, investors, executives, governments and financial institutions (Carroll & Buchholtz, 2008). According to Atkinson, Waterhouse and Wells (1997), organisations often have a number of stakeholders who, generally, represent five predominant groups: customers or consumers, employees, suppliers (i.e., feedstock or other merchandise, services and obligations), owners and the community in general.

Communicational management should think about sustainability, mobilising and raising awareness for its effectiveness, deepening relationships and partnerships

that promote a healthy interaction between organisations and their stakeholders (Lattuada, 2011).

There is a significant relationship between internal communication and the employees' commitment to change on affective commitment, continuance commitment and normative commitment. Thus, internal communication affects the employees' attitude to engage and commit to change in their company (Marchalina & Ahmad, 2017).

A study yielded an unexpected finding regarding culture influences. Specifically, the organisational culture of innovation did not show a unique significant contribution to a symmetrical communication system or employee relational outcomes. Although different types of organisational culture may coexist and are preferred by management based on circumstances and purposes, emphasis on rewards, stability, and supportiveness plays a more critical role in influencing internal communication and employee-organisation relationships (Men & Jiang, 2016).

Kotler (1999) pays special attention to companies that manage bad relationships with stakeholders. According to this author, in the case of internal public, respecting employees and treating them as creative and responsible people has become a new paradigm in organisations. The smartest organisations adopt the practice of internal marketing that considers the different needs of their employees, and, when they know who they are, organisations can better answer and satisfy their employees. For Miles & Muuka (2011), internal communication gives voice to the micro-decisions and actions actually undertaken by organisational members, not just being the broadcaster of top management strategic directions, but also allowing top managers to get in touch with the actual dynamics taking place in the organisation.

Leadership has been identified as vital for a prudent performance of stakeholder management (Elmualim, 2010). For Bourne (2009) all activities' success or failure, whether they are operational, strategic or tactical, depends on the input, commitment, and support of the stakeholders.

More and more, a culture of orientation towards people and stakeholders and the effective management of various organisational constituents are considered as crucial components of the process for the success and effectiveness of any organisational system (Jacobson, 1994; Shuler & Jackson, 2001). The importance of employees as communication assets should never be overemphasised (L. Men, 2011a, 2011b).

The company's ability to achieve competitive advantage in relationships with stakeholders can be a key to organisational success (Polonsky, 1995). According to Kim and Rhee (2011), the way employees perceive the organisation determines what they say in public, and their opinions, consequently, become the basis for how other stakeholders perceive the organisational reputation. This is due to the fact that the information that employees convey about the organisation is often perceived to be more credible and authentic.

The relationship with stakeholders is extremely important for institutional crises, since it highlights the importance of internal stakeholders in preventing these events and emphasises the need for the perception of problems, so as to prevent crises, to establish ties, trust and credibility with stakeholders, which can minimise and eliminate crises. Thus, organisations must have a structured communication sector, which constantly develops programs for their audiences (Fearn-Banks, 2011).

According to Gilbert, Stoner and Freeman (2009), organisational survival depends on the organisation's ability to develop and maintain a balance with stakeholders, particularly with those who can most significantly influence its performance.

Also Carroll and Buchholtz (2000) state that, given the economic, social and political importance that stakeholders have, the organisation's managers have the responsibility to establish the overall management of the organisation – in its objectives, policies and strategies – and to make sure that the “plan” is followed. Stakeholder management has become important from the time when managers discovered that people, whether belonging to the organisation or not, must be motivated with it in order to help the organisation achieve its goals. Nowadays, the most successful organisations are not led by one, powerful, charismatic leader, but

are the product of distributed, collective, and complementary leadership (De Vries, Bakker-Pieper, & Oostenveld, 2010).

Goodijk (2003) claims that, in this competitive environment, management must build acceptable relationships with several stakeholders, creating opportunities for dialogue and engagement, as well as being accountable to all stakeholders. Hill and Jones (1992) stress the need to recognise legitimate actions or interactions, established or developed by stakeholders. This effect tends to be different according to the size, age and type of organisation, skill management, systematised information on the duties and rights, market positioning, products and services. Typically, stakeholders are suppliers of resources or critical contributors to the organisation, in terms of trade, expecting their interests and objectives to be met.

Good relationships with internal stakeholders can be a support in times of crisis, since a satisfied stakeholder contributes to the defence of the institution. In addition, a corporate culture focused on people is also an effective tool for institutional development (Fearn-Banks, 2011).

Generating awareness, along with information sharing and word-of-mouth, cultivating long-term relationships, developing new businesses, and building image and reputation are the primary purposes for stakeholder engagement (Chen, Ji, & Men, 2017).

The importance of a study, analysis and research on stakeholder acting is supported by the stakeholder theory, which suggests that the strategic behaviour of the organisation is affected by various groups located in its environment, and the organisation's strategies should seek to satisfy them in the best possible way, otherwise failing in the implementation of its policies and guidelines (Shuler & Jackson, 2001).

Also important is the role of transparency as a means to manage stakeholder relationships. Transparency leads to greater trust in the organisation through its effects on stakeholder perceptions of organisational trustworthiness; greater transparency of organisations (in the form of greater disclosure, clarity, and

accuracy) will facilitate higher stakeholder trust in the organisation (Schnackenberg & Tomlinson, 2016).

Communication within the organisation has to involve a downward and upward flow. Effective downward communication allows decisions made by the management of the organisation to be converted into action by employees; it also boosts teamwork, trust, better relationships, productivity and fewer chances of rumours and miscommunication. Upward communication helps managers understand both business and personal issues that affect employees. In addition, creative suggestions from employees help management in decision making and improving the organisation (Rajhans, 2012).

While the conventional view is that the business simply exists to respond to signals from markets and the economic system, and, therefore, the company's aims are connected to profit, the stakeholder theory offers an alternative to both corporate institutions and governments as to what the purpose of a business is. That purpose is to serve as a vehicle for coordinating stakeholder interests and meeting the demands of each group of stakeholders who are affected by corporate actions (Hoffman & Frederick, 1995). The ability to develop and maintain close relationships with prominent organisational stakeholders indicates that these relations will persist in the future (C. Alexander, Miesing, & Parsons, 2005).

So, the expression "stakeholder" refers to groups, whether internal or external, of individuals and/or institutions that could potentially interfere with the performance of an organisation, influencing organisational behaviour and mechanisms of change.

2.5. The Moodle Platform as communication tool

Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalised learning environments (Moodle, 2017a) and is one of the most commonly used e-learning platforms worldwide (Harris & Rausch, 2013). Moodle (Modular Object-

Oriented Dynamic Learning Environment), also known as Learning Management System (LMS), or Virtual Learning Environment (VLE), is an open-source virtual learning environment and a course management system that is used for educational purposes.

The potential users of Moodle are: teachers/trainers, responsible for the areas of education/training in enterprises, schools and organisations, teams to support computer-mediated learning activities, educational technology or people interested in use or experience to deliver distance learning courses, in addition to lectures or classroom courses and mixed classes (Lisbôa et al., 2007).

Under a philosophy called SCP (Social Constructionist Pedagogy), Dougiamas (1998) developed Moodle. This philosophy is based on the following principles (Moodle, 2017b):

- Constructivism advocates that, from a constructivist point of view, people actively construct new knowledge as they interact with their environments.
- Constructionism asserts that learning is particularly effective when constructing something for others to experience. This can be anything from a spoken sentence or an internet posting, to more complex artefacts, like a painting, a house or a software package.
- Social constructivism extends constructivism into social settings, wherein groups construct knowledge for one another, collaboratively creating a small culture of shared artefacts with shared meanings. When one is immersed within a culture like this, one is learning all the time about how to be a part of that culture, at many levels.

Dougiamas (1998) claims that constructivism occurs especially well when the learner is engaged in constructing something for others to see. Its goal is to provide a set of tools that support an inquiry- and discovery-based approach, to create an environment that allows for collaborative interaction. This theory focuses on sharing of opinions, ideas, and other social artefacts (Brandle, 2005).

Currently, there are 81,372 active registered websites from 235 countries (Moodle, 2017c). In Portugal there are a total of 1,223 websites (648 are private and are not

shown) (Moodle, 2017d). Among these, are establishments of varying educational levels, from which we highlight: the Faculty of Engineering – University of Porto, the Faculty of Science and Technology – New University of Lisbon, University of Évora, many secondary schools, polytechnic institutes and several other institutions offering education in various areas.

The Moodle Platform, created with the incentive of the Ministry of Education, has the objective of promoting interaction and experimentation through technological resources, allowing students and teachers to work collaboratively and establish an interactive network for the transmission of information, development and updating of knowledge through asynchronous and synchronous tools (Cardoso, 2014).

Table II.2 presents statistical data on the use of Moodle worldwide (Moodle, 2017c).

Table II.2 – Moodle Data

Registered sites	81,372
Countries	235
Courses	12,276,294
Users	105,345,216
Enrolments	364,060,936
Forum posts	218,863,009
Resources	111,392,906
Quiz questions	600,985,072

Source: Moodle (2017c).

Moodle is a well-built Management System that had a satisfactory level of usability (Kirner, Custodio, & Kirner, 2008), and it is not only defined as the most widely implemented open source solution in higher education, but also the most user-friendly, even compared to closed sources (Alexander, 2006; Cavus & Momani, 2009). In their study, Perkins and Pfaffman (2006) highlighted the advantages of using Moodle as a free open-source software program that not only provides a set

of features similar to those of its proprietary competitors, but it is also often easier to use.

A study carried out about Moodle as a communication tool noted that it is easy to use, controllable, easy to become skilful, clear and understandable, but this study also highlighted the need for some enhancements in Moodle, in order for it to become more effective (Pektas & Demirkan, 2011).

Moodle has been adopted by many universities and organisations all over the world because it offers a large set of tools, and many components were developed without a specific design documentation, including its security services (Muhsen, Maaita, Odah, & Nsour, 2013).

Moodle provides instructors with useful features, such as the ability to embed resources, activities that are centred on a topic of study and a variety of modes of operation. The main advantage of integrating free open source software such as Moodle on campus is the discharge of license costs. In addition, system administrators have the ability to modify and customise the product (Baytiyeh, 2013).

A study was carried out at the University of Castilla-La Mancha in Spain, which suggested that students were generally satisfied with Moodle (Sánchez-Santamaría et al., 2012), and that it was mainly seen as a resource for accessing and organising materials.

According to Melton (2006), Moodle conforms to many of the conventions for usability: it has a simple interface, uses a minimal number of words, features rollovers providing extra information, and often includes simple icons with the words to aid users.

Moodle improves communication and enhances cooperation (Pinto, 2008). One of the advantages of using Moodle in schools is that it allows the management and administrative activities of the school. As an example, it can serve as a basis for communication, management and archiving of documents (Fernandes & Maneira, 2008). Further advantages of the use of Moodle is that it facilitates the execution of collaborative/cooperative work, leading to a collective discussion and knowledge building (Fernades & Negrão, 2008; Fernandes & Maneira, 2008) and

its flexibility and adaptability to different publics, because it adapts to recipients with different needs and goals (Flores et al., 2008).

The use of Moodle also values aspects of communication, since it allows the execution of a project; whatever its stage of development, there may be a need to solve problems remotely or simply to share ideas and common practices (Miranda et al., 2008).

However, there are some disadvantages in the use of Moodle, which are: availability of time (Fernandes & Maneira, 2008) and technical issues of use (Campos & Al., 2008).

Kim and Lee (2008) argued that suitability of design on screen and in system, ease of course procedure, inter-operability of system and suitability of academic administration, ease of instructional management and appropriateness of multimedia use, flexibility of interaction, and user accessibility are factors that can deeply benefit those involved in e-learning for their practices and for assessing the effectiveness of LMS in support of e-learning and not just focusing on functionalities of LMS.

A study developed in Portugal concluded that Information and Communication Technologies (which include the use of the Moodle), leadership and communication are fundamental bases for progress and affirmation of school organisations. They are also decisive factors to the success in terms of “organisational excellence” (Freitas, 2013) and an example of a “good practice” regarding the use and integration of the Moodle Platform in school activities.

Therefore, Moodle is a great tool that allows better interaction and easy collaboration with the user in real-time, and allows sharing useful information, documentation, opinions, suggestions, difficulties and knowledge management.

2.6. Portuguese Public Schools as Organisations

This section aims to analyse Portuguese Public Schools in society. This analysis is justified by the need to understand the main characteristics of these organisations.

The Portuguese educational system, with regard to primary and secondary cycles, is mainly composed of public schools (Afonso, 2010). The management of public schools has been characterised essentially by procedures, which perform the mandates of legal norms of the central structures of educational administration.

With regard to education, the Portuguese Constitution elects it as a key task of the State, “Ensuring education [...]” (*article 9, paragraph f*), guaranteeing all citizens, including the rights and fundamental duties, the “freedom to learn and teach” (*article 43, number 1*).

Concerning the way the structures of governance and management are articulated, the educational system has a strong tradition of centralisation, given the weight and role of the (central) government and the Ministry of Education, in terms of organisation, policy, programmes, curricula, financing, monitoring, control and inspection, evaluation of schools, teachers’ performance evaluation and also student learning evaluation (Afonso, 2010).

Thinking about an organisation requires necessarily to think about the people that work and cooperate to achieve common objectives and the relationships established between them.

The interpretation of school as an organisation has found, during the last century, several images that tend to be associated with different configurations defined by theorists of organisations (R. Silva, 2003).

According to Schein (1985), organisations are open systems in constant interaction with the environment, and are made up of many subgroups, occupational units, hierarchical strata and geographically dispersed segments.

In a first approach to the concept of school, it can be affirmed that school is an organisation of formal education, characterised by the features of systematicity, sequence, direct personal contact, extension, public interest services it provides and certification of knowledge it delivers (Formosinho & Machado, 1998).

Lima (1998) declares school as organisations. According to this author, school shares with most of other organisations the presence of a number of elements – goals, power, structures, technologies, etc. –, in addition to being a social unit created to obtain certain purposes.

In this sense, school is an organisation that is a social reality, because, in addition to the physical structure, it is a space where actions [are] carried out by people in an interacting system characterised by certain statutes, rules and roles operation – formal and informal (Alves Pinto, 1995).

Mintzberg (1980) studied different structures, dynamics and organisational configurations and suggests a typology of five basic configurations: Simple Structure, Machine Bureaucracy, Professional Bureaucracy, Divisionalised Form and Adhocracy. Mintzberg (1980) refers that school has been integrated in a Professional Bureaucracy model, characteristic of organisations that ascribe high importance to the production staff, who are assigned a high degree of autonomy, ideal for an essentially normative system where the main objective is the production with reproductive purposes. That coordinating mechanism is the standardisation of skills, which gives rise to the configuration called Professional Bureaucracy, found typically in school systems, social work agencies, accounting firms, and craft manufacturing firms. The organisation hires highly trained specialists called professionals – in its operating core –, and then gives them considerable autonomy in their work.

In his analysis of educational organisations, Estêvão (1998) makes mention of the rational bureaucratic model, stating that educational organisations hold a single set of clear objectives that guide their functioning, and that these objectives or goals are translated to the upper levels of bureaucracy on rational criteria implementation for teachers and other stakeholders.

According to Lima (1998), the organisational model, i.e., bureaucracy, is a conceptual and theoretical framework best used for analysis and description of educational organisations. This author considers that the bureaucratic model emphasises the importance of abstract rules and formal structures, planning

processes and decision making, consistency of objectives and technologies, the stability, consensus of organisational actions.

Also Costa (2003) enumerates, as the most significant indicators, the school bureaucratic image, which includes: the detailed regulation of all activities from the strict division of labour, predictability operating from of a rigorous planning organisation, an organisational structure with formalisation, hierarchy and centralisation of schools, obsession with written documents, actuating according to a routine that results of compliance with standards and uniformity, and impersonality in human relationships.

In this context of marked centralisation, one of the important issues (and tensions) that has crossed educational policies over these last four decades in Portugal is the definition, nature and extent of school autonomy.

In Portugal, the history of autonomy is short because only after April 25, 1974 did changes occur because of the democratisation of politics. As Afonso (1999) refers, it is practically impossible to talk about school autonomy before April 25, 1974, considering the political regime – a dictatorship.

The exercise of autonomy for schools is within the context of regulatory power and administrative state, since this power is justified given the need to maintain equity of service at the national level and safeguard democratic management. Afonso (2010) refers that autonomy has become an instrument of regulation and governance, which fits in the new forms of State action within and beyond the national space.

Analysing school autonomy, its bureaucratic characteristics stand out, which result from the fact that school management is conditional to the compliance with the legal regulations and supervision by the central administration.

Thus, in Portuguese Public Schools there is a moderated autonomy due to an autonomy decreed by political means with instrumental value; it comes down to a management technique that, in essence, is an operational autonomy (Formosinho, 2000; Lima, 2004).

To finalise, this section shows the number of teachers and educational institutions existing in Portugal. In Portugal, there are 122,452 teachers distributed by the following educational levels: Pre-School Education, Elementary Education (1st Cycle), Basic Education (2nd and 3rd Cycles) and Secondary Education (Table II.3).

Table II.3 – Teachers in pre-school, elementary, basic and secondary public education: total and by educational level

Year	Education level					
	Total	Pre-School Education	Elementary Education	Basic Education (2 nd and 3 rd cycles) and Secondary Education		
				Total	2 nd Cycle	3 rd Cycle and Secondary Education
2016	122,452	8,941	25,706	87,805	20,946	66,859

Source: PORDATA (2017a).

With regard to the number of public establishments in Portugal, there are 10,160, distributed by the following educational levels: Pre-School Education, Elementary Education - 1st Cycle, Basic Education – 2nd Cycle, Basic Education – 3rd Cycle, and Secondary Education (Table II.4).

Table II.4 – Pre-school, elementary, basic and secondary public education establishments by educational level

Geographic scope	Pre-School Education	Elementary Education – 1 st Cycle	Basic Education – 2 nd Cycle	Basic Education – 3 rd Cycle	Secondary Education	TOTAL
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Portugal	3,702	3,796	932	1,146	584	10,160	Year - 2016
Continent	3,463	3,566	873	1,083	542	9,527	
Autonomous Region of the Azores	142	145	32	34	22	375	
Autonomous Region of Madeira	97	85	27	29	20	258	

Source: PORDATA (2017b)

CHAPTER III - Research Methodology

3. Research Methodology

This chapter includes information on the methodological procedures used, referring to qualitative and quantitative research, and explains the stages of the research.

3.1. Methodology

Chapter II of this thesis presented the literature review related to IS, the review of the DeLone and McLean's (2003) model, the analysis of the DeLone and McLean's model applied to Educational Organisations, the Moodle Platform as communication tool and internal communication, and the theory of stakeholders.

Subsequently, this chapter addressed Portuguese Public Schools and the level of their organisational and functional structure, as well as the analysis of their stakeholders. This analysis is justified by the need to understand what the main characteristics of these organisations are.

Studies should not be limited to a single source of evidence and, therefore, the articulation of data is the justification for using multiple sources of evidence (Yin, 2013). Consequently, it is intended to collect data from Portuguese Public Schools and carry out a mixed methods research.

According to Creswell (2012), a mixed methods research design is a procedure for collecting, analysing, and "mixing" both quantitative and qualitative research and methods in a single study to understand a research problem. Mixed methods are defined as a research approach or methodology (Johnson, Onwuegbuzie, & Turner, 2007):

- focusing on research questions that call for real-life contextual understandings, multi-level perspectives, and cultural influences;

- employing rigorous quantitative research assessing the magnitude and frequency of constructs and rigorous qualitative research exploring the meaning and understanding of constructs;
- utilising multiple methods (e.g., intervention trials and in-depth interviews);
- intentionally integrating or combining these methods to draw on the strengths of each one of them;
- framing the research within philosophical and theoretical positions.

The combination of quantitative and qualitative research methods in the same study, i.e., the use of mixed methods, is taking on increasing importance (Creswell, 2008), inasmuch as both quantitative and qualitative data, together, provide a better understanding of the research problem than either type by itself (Creswell, 2008).

There are two main factors that can help determine the various types of mixed methods design (Creswell, 2012; Johnson, Onwuegbuzie, & Turner, 2007):

- Priority/weight/emphasis of approaches. In a mixed methods study, the researcher can give the same priority, weight or status to the quantitative and qualitative aspects (equal weight designs), or alternatively may give greater weight to one of them (different weight designs);
- Implementation of data collection/time orientation. This refers to the order in which the researcher collects quantitative and qualitative data. The two options are collecting information at the same time (simultaneous, concurrent or parallel designs) or obtaining data at different points (sequential or two-stage designs).

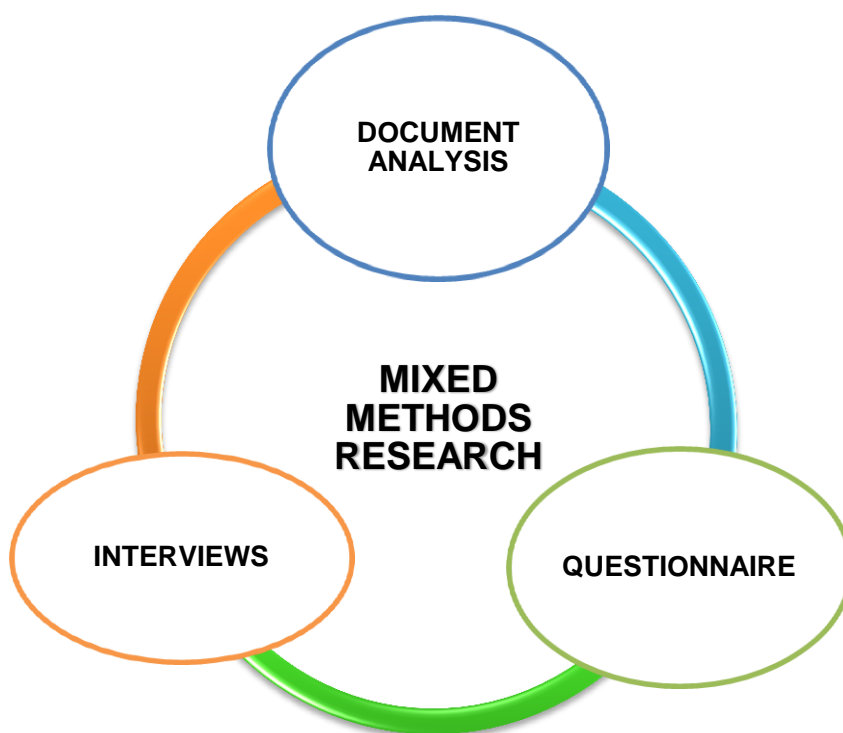
The mixed methods utilise both quantitative and qualitative data collection methods that can include (Creswell, 2012; Johnson, Onwuegbuzie, & Turner, 2007): interviews and questionnaires; performance tests and observation; questionnaires and follow-up focus groups; document analyses; performance tests.

The choice of mixed methods research in this study will enable a comprehensive investigation of the valuation of internal stakeholders' satisfaction with communication, using the Moodle Platform as communication tool, in Portuguese Public Schools. This allows to make a qualitative and a quantitative data analysis, both through the use of various techniques of data collection.

To carry out data collection, the following techniques have been used: interviews with stakeholders, a structured questionnaire and document analysis.

3.2. Techniques used

Figure III.1 – Techniques used



Source: Own elaboration.

3.2.1. Document analysis

Document analysis is an operation or set of operations to represent the content of a document in a different form from the original, in order to facilitate its subsequent consultation and referral (Bardin, 2008, 2015). The collection of data on documents serves mainly to supplement evidence obtained from other sources (Yin, 2013).

In this research, document analysis included essentially the analysis of the type of communication vehicles used in Portuguese Public Schools.

According to Bardin (2008, 2015), document analysis is done mainly by classification-indexation and by means of transformation procedures, with the purpose of analysing and representing, in a condensed manner, the information from the researched elements, which allow to elaborate a secondary document with the maximum of pertinent information on the thematic focus.

The document analysis treatment objective is to describe and represent the content of documents in a way that is different from the original, ensure the retrieval of the information in content and enable its exchange, dissemination and use (Iglesias & Gómez, 2004).

Document analysis proposes to produce new knowledge, to create new ways of understanding phenomena and to make known how they have been developed (Bogdan & Biklen, 1994, 2013; Quivy & Campenhoudt, 2005).

This procedure can be used in teaching in the perspective of the researcher to “immerse” in the field of study, seeking to capture the phenomenon from the perspectives contained in the documents, contributing to the area they are inserted in, whether in the area of education, health, exact sciences and biological or human sciences (Guba & Lincoln, 1981).

Some advantages of document analysis consist of the low cost and stability of information by being “fixed sources” of data, and because this technique does not change the environment or the subjects. Moreover, it also allows the researcher greater accessibility and is used to ratify, validate or complement information

obtained by other data collection techniques (Bogdan & Biklen, 2013; Guba & Lincoln, 1981; Quivy & Campenhoudt, 2005).

Thus, this technique is considered as the treatment of the content so as to present it differently from the original, facilitating its consultation and referral; that is, document analysis is intended to give appropriate form and represent this information in a different way, by means of transformation procedures (Bardin, 2008).

3.2.2. Interviews with teachers

Interviews were one of the techniques used for data collection in this research. They were performed using a script, i.e., were semi-structured interviews, and were carried out to teachers.

The research strategy that uses qualitative analysis seeks to explain and understand a human fact. These techniques favour the use of the word to describe the phenomenon observed (Mucchielli, 2005). The interview takes on high importance in this study, because through it the researcher realises how subjects interpret their experiences, in addition to also being used to gather descriptive data in the language of the subject him/herself, allowing the researcher to intuitively develop an insight about the way subjects interpret aspects of the world (Bogdan & Biklen, 2013; Mucchielli, 2005).

Interviews can be classified as structured and un-structured. Structured interviews are those that bring in the previously structured questions. In the un-structured interview, the researcher, through a friendly conversation with the interviewee, conducts the interview (Gillham, 2005; Kvale, 2009).

In addition to these types of interviews, there is also the semi-structured interview, which is an instrument of information of specific issues, previously defined by the researcher, allowing, at the same time, non-planned holdings (Gillham, 2005; Kvale & Brinkmann, 2009).

For this research, the choice of semi-structured interviews was related to the fact that the interviewer wanted to give the interview some flexibility and dynamism, so as not to tire the interviewee too much and to achieve greater interaction, leaving the respondent free for his/her own comments, but taking into account the objectives of this work.

When carrying out semi-structured interviews, researchers recommend the use of a basic checklist that helps covering all relevant areas of the research questions. The advantage of such a checklist is that it allows the interviewer to keep the interview within the parameters traced out by the aim of the study (Berg, 2007; Kvale, 2009).

Controlling the situation made it possible to guide the interviewee to the most relevant issues. For the interviews conducted, an interview guide was built with specific questions, but a dialogue in a conversational manner was ensured.

Through the interviews conducted, it was sought to perceive the most common feelings, concerns and perceptions experienced by the teachers regarding the existing internal communication in Portuguese Public Schools.

The method used for the analysis of the data from the interviews was content analysis, following Laurence Bardin (2008, 2015).

Content analysis is a set of increasingly subtle methodological tools in constant improvement. This method is applied to speech, that is, to everything that conveys a message. It can be applied in interviews, articles, film images, in short, any form of communication, whether verbal or non-verbal (Bardin, 2008, 2015).

For Bardin (2008), content analysis of messages has two functions:

- Heuristic function – content analysis enriches the exploratory attempt, increases the propensity for discovery; it is the content analysis to ‘see what it gives’;
- Evidence management function – hypotheses in the form of questions or interim statements serving as guidelines. They will appeal to the method of systematic analysis in order to be verified in the sense of a confirmation or information; it is the content analysis to ‘serve as proof’.

The Laurence Bardin's (2008, 2015) content analysis method was divided into three phases:

- Pre-analysis – in this phase there was a selection of themes or words that convey meaning to the text. Indices of relevance were chosen in the context of the materials. At this stage, the following rules were also observed: completeness, representativeness, homogeneity, relevance and exclusivity;
- Exploration of the material – this was the longest lasting phase. It was done through the resolutions taken in the pre-analysis. This stage consisted of the definition of the registration units and the context units, the definition of category systems and coding systems, and the identification of registration units in documents;
- Treatment of the results obtained and interpretation – this phase covered inference and interpretation. Inference is an instrument of induction, through which one can investigate both the sender of the message, and also provide information about its receiver, or about the meaning of the message itself. In turn, interpretation seeks what is hidden under the apparent reality, what is that the enunciated discourse truly means, in depth.

Categorical analysis, evaluation analysis, enunciation analysis, expression analysis, relationship analysis and discourse analysis are the possible techniques used in content analysis (Bardin, 2008, 2015).

Thus, content analysis is a set of techniques of qualitative data analysis, aiming to obtain, by systematic procedures and objectives of description of the content, the indicator messages (quantitative or not) that allow the inference of knowledge regarding the conditions of production/reception (variables inferred) of these messages (Bardin, 2008).

Categorical analysis

Categorisation is the process of dividing the world into groups of entities whose members are in some way similar to each other. Recognition of resemblance

across entities and the subsequent aggregation of similar entities into categories leads the individual to discover order in a complex environment (Jacob, 2004).

In order to respond to the problem and the objectives of this study, the data collected through the interviews was analysed using the content analysis technique, which, according to Bardin (2008, 2015), consists of the division of the text into groups categorically grouped together.

Classifications may be deductive, top-down schemes that enumerate a set of mutually exclusive classes. An enumerative classification scheme begins with a universe of knowledge and a theory of organisation or set of principles that establishes the conceptual structure of the scheme. Whether the universe encompasses all knowledge or is limited to a specific domain, the construction of the scheme involves the logical process of division and subdivision of the original universe, so that each class, or each level of classes in the structure is differentiated by a particular characteristic or property (e.g., the property “colour” or “shape”). The result is a hierarchical structure of generic (genus/species) relationships wherein each subordinate class is, theoretically, a true species of the superordinate within which it is nested (Jacob, 2004).

So, the option for categorical analysis is supported by the fact that it is the best alternative when the purpose of the research is to study ideals, ideas, attitudes and beliefs.

The process of categories definition was carried out as predicted by Bardin (2008, 2015); after the selection of the material and the floating reading, the exploration was carried out through codification.

A set of good categories must have the following qualities (Bardin, 2008: 147-148):

- Mutual exclusion: each element cannot exist in more than one category;
- Homogeneity: in a categorical set, there should be a single record and analysis dimension;
- Relevance: the categories should be adapted to the chosen analytical material and the defined theoretical framework;

- Objectivity and fidelity: the different parts of a material, submitted to the same categorical grid, must be coded in the same way (variables, indices);
- Productivity: a categorical set provides fertile results.

The codification is made through the repetition of words, which, once triangulated with the observed results, are constituted into units of registration, so that the progressive categorisation may be carried out.

Therefore, in this study, based on the script of the interviews, the treatment of interviews to the teachers was made according to the following procedure (Bardin, 2008, 2015):

1. **Initial categories** – Based on the script of the interview, teachers' opinions, often repeated, were configured as the first impressions about the organisational reality studied. As a result, there was a first codification of the transcribed interviews. Each category consists of the selected excerpts from the interviewees' speeches, and also has the support of the theoretical framework.
2. Next, the **Intermediate categories** were defined – which were the main ideas of the teachers that resulted from the initial categories, that is, this stage consisted of systematising teachers' opinions.
3. The previous procedure gave rise to the **Main idea** – understands in and explains generically the main idea of the category.
4. **Finals Categories** – which were grouped by subject.

3.2.2.1. Interview script

As previously stated, interviews were one of the techniques used for data collection in this research. They were performed using a script, i.e., were semi-structured interviews. Please see Appendix D – Interview script.

The interviews were made to teachers.

3.2.3. Structured questionnaire

In the construction of the questionnaire the methodology of Hill and Hill (2008) was followed. According to these authors, and since any empirical investigation presupposes data collection, it is necessary to have an instrument that allows this collection.

In preparing the questionnaire, the following rules were followed (Hill & Hill, 2008):

- General presentation of the questionnaire, reason for its application, declaration of confidentiality of the responses and the anonymous nature of the questionnaire, and a request for cooperation to complete it.
- Concern about the clarity and size of the questionnaire and the establishment of homogeneous blocks of questions.
- Concern about the layout of the questionnaire.
- Final verification of the questionnaire.

Since the objectives defined for this study presuppose the construction of a questionnaire, the methodology used for its elaboration involved preliminary studies. These are small-scale studies, whose purpose is to provide relevant information, namely, to find the variables to be included in the main research. This type of study is useful when the main research aims to confirm or extend a work in the literature and there is no appropriate questionnaire for the research concerned.

The first part of the preliminary study aimed to find the most important variables to include in the main research. At the end of this initial study, a first version of the questionnaire was designed.

As advocated in literature (Ghiglione & Matalon, 2001), when the first version of the questionnaire was drafted, it is necessary to ensure that the questionnaire is, in fact, applicable and that it responds to the problems posed by the researcher. Thus, before the final layout of the questionnaire, a pre-test was performed.

The pre-tests aim to improve the questionnaire, that is, to know if the questions do not cause doubts, do not cause inconveniences and are explicit (Ghiglione & Matalon, 2001).

Three teachers working in different Portuguese Public Schools were selected for the pre-test.

This test was extremely important, because the objective was to have a critical analysis of people, which made it possible to refine the questionnaire.

After the review, the questionnaire was formatted to improve its layout and a change was made to the introduction that fitted the research objectives.

Subsequently, the questionnaire was reviewed by the thesis supervisors and it was decided to insert four questions related to the use of the Moodle Platform, namely:

- I use the Moodle Platform to communicate and interact with colleagues;
- I use the Moodle Platform to communicate and interact with the school board;
- I use the Moodle Platform for pedagogical work with students;
- I use the Moodle Platform to communicate and interact with students – and an open question.

Finally, the questionnaire reached its final version. Please see Appendix B – Final version of the questionnaire – English version.

Regarding the development of the questionnaire, several sources were used, namely: review of the literature, document analysis, interviews conducted and phases of the pre-test questionnaire.

Statistical treatment – Factor Analysis

The questionnaire was divided into three parts:

- Part I – Socio-demographic and professional section;

- Part II – Use and efficiency of communication vehicles;
- Part III – Internal Communication.

Factor analysis was used for the treatment of the data collected by Part III of the questionnaire.

Factor analysis is a method used to investigate the dependence of a group of variables expressed in relation to the smaller number of latent variables. This is a multivariate statistical analysis technique designed to identify observed structures in sets of variables, explaining the interrelation between variables in order to identify new variables (factors) and establish dimensions (Hair et al., 2010).

The main objective of factor analysis is to establish the relationship of covariance between variables in some hidden “factors” (Kim & Charles, 1978). This technique assumes that the variables can be grouped according to their correlation with the result, groups with all highly correlated variables and low correlations with variables of a different group (Gorsuch, 1997). Each construct or factor is represented by a group of variables identified by the observed correlations (Mulaik, 1990; Steiger, 1990).

There are two types of factor analysis, which should be appropriate to the objectives of each study (Stewart, 1981) they are applied to, specifically:

- Exploratory Factor Analysis (EFA) – performed when little is known about the underlying relationships between the data sets;
- Confirmatory Factor Analysis (CFA) – developed to test hypotheses regarding the structure of a data set; such analysis is useful for the construction of theory.

Both analyses, EFA and CFA, are statistical approaches used to examine the internal reliability of a measure, to investigate the theoretical constructs or factors that might be represented by a set of items, and to assess the quality of individual items. They can also assume the factors are uncorrelated or orthogonal (Stewart, 1981; Preacher & MacCallum, 2003; Hair et al., 2010).

In the present study, an EFA was used. When using this type of factor analysis, researchers generally decide on the number of factors by examining outputs from

a principal components analysis (i.e., eigenvalues are used). With CFA, researchers must specify the number of factors *a priori*. EFA allows all items to load on all factors, whereas CFA requires that a particular factor structure be specified, in which the researcher indicates which items load on which factor (Mueller, 1996; Preacher & MacCallum, 2003).

Furthermore, EFA is generally used to learn the factor structure of a measure and to examine its internal consistency. EFA is often recommended when researchers have no hypotheses about the nature of the underlying factor structure of their measure (Preacher & MacCallum, 2003; Hair et al., 2010). There are three basic decision aspects on EFA (Stewart, 1981; Hair et al., 2010), namely:

- Deciding the number of factors;
- Choosing an extraction method;
- Choosing a rotation method.

In the first phase of this research study, the verification of the consistency of the original data was made (see Table IV.26 – KMO and Bartlett's Test

Afterwards, based on the initial eigenvalues, the number of factors was determined, (see Table IV.27 – Total Variance Explained

Finally, an extraction method and a rotation method were chosen (see Table IV.28 – Rotated Component Matrix.

The study statistics were obtained through IBM SPSS (Statistical Package for the Social Sciences), Version 24 64 bit edition.

The results are presented in the next chapter.

CHAPTER IV - Presentation of Results

4. Presentation of Results

In this chapter the results and the data of the field work (empirical part) are presented, referring to the empirical research applied in the Portuguese Public Schools where the study was conducted.

In this chapter, the research hypotheses are also tested.

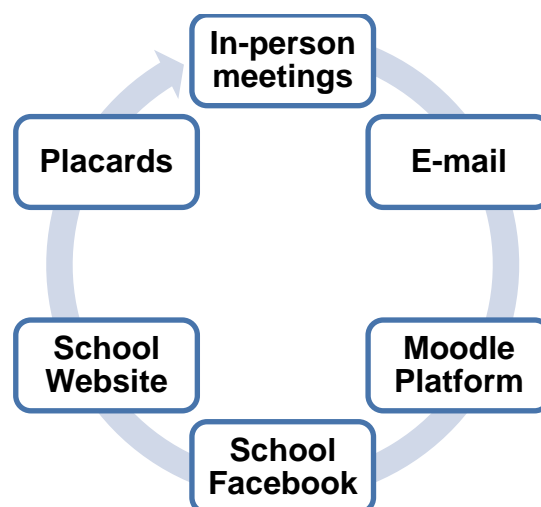
4.1. Document analysis

In the first phase an analysis was made in several Portuguese Public Schools to identify/know the main communication vehicles.

This phase was followed by an Internet search on several websites of Portuguese Public Schools to verify if they had a website, a Moodle Platform and Facebook, having reached the conclusion that most of these schools have these three means of communication, namely the first two.

The existing communication vehicles in Portuguese Public Schools are presented in Figure IV.1.

Figure IV.1 – Communication vehicles in Portuguese Public Schools



Source: Own elaboration.

4.2. Interviews with teachers

All interviews were conducted individually. Table IV.1 presents a generic characterisation of each teacher.

Table IV.1 – Characterisation of the interviewed teachers

Teacher	Characteristics
Teacher 1	Male 28 years old 6 years career Contracted teacher
Teacher 2	Female 58 years old 28 years of career Teacher with place in the school board
Teacher 3	Female 40 years old 16 years of career Teacher of the pedagogical zone
Teacher 4	Female 22 years of career 44 years old Teacher with place in the school board
Teacher 5	Male 35 years old 7 years of career Contracted teacher
Teacher 6	Male 49 years old 26 years of career Teacher with place in the school board
Teacher 7	Male 52 years old 12 years of career Contracted teacher
Teacher 8	Female 44 years old 20 years of career Teacher with place in the school board
Teacher 9	Male 41 years old 16 years career Teacher of the pedagogical zone
Teacher 10	Female 52 years old 26 years of career Teacher with place in the school board
Teacher 11	Female 52 years old 26 years of career Teacher with place in the school board

Source: Own elaboration.

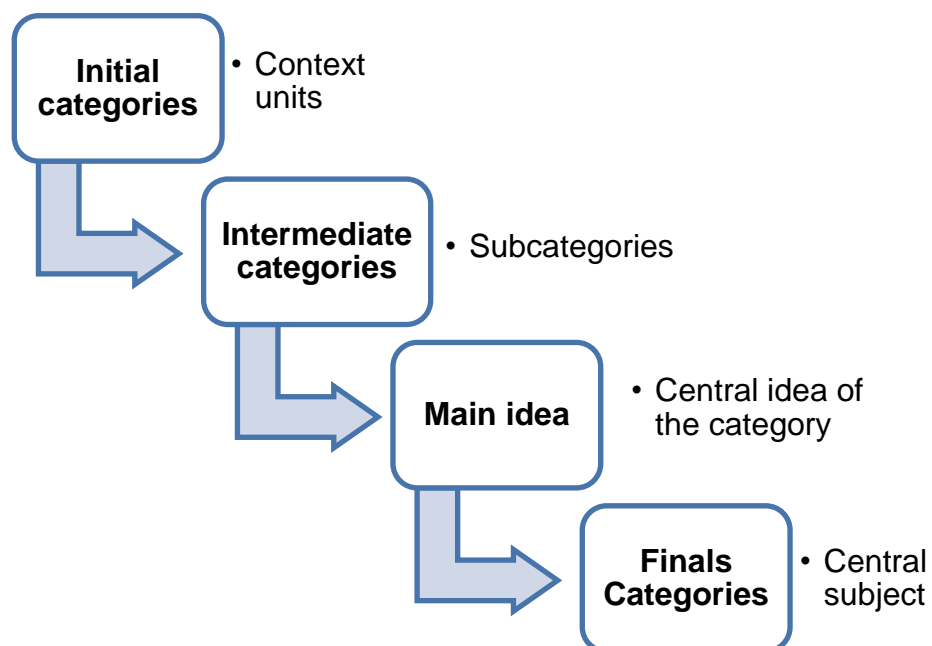
This part shows the results obtained in the interviews with teachers, which followed the procedure described in section 3.2.2 – Interviews with teachers, and subsection Categorical analysis.

The results are shown by block defined in the Interview script explained in section 3.2.2.1 – Interview script.

Afterwards, this part of the chapter presents a scheme with the name of the categories and their main purpose, used in the interviews with teachers.

Figure IV.2 summarises the steps followed in the categorisation process.

Figure IV.2 – Scheme of the categories used in the interviews with teachers



Source: Own elaboration.

With the intention of showing systematically the progressive construction of categories of analysis that emerged from the interviews with teachers, the following tables summarising this construction were prepared.

Table IV.2 shows the results of the interviews with teachers, which were defined in the interview script, with regard to Block II.

Table IV.2 – Results of interviews with teachers – Communication vehicles

INITIAL CATEGORIES	INTERMEDIATE CATEGORIES	MAIN IDEA	FINAL CATEGORIES
<p>“[...] I think that email and in-person meetings, are efficient [...]”</p> <p>“[...] The existing vehicles in school are efficient and sufficient [...]”</p> <p>“[...] As a rule, communication vehicles are used in an appropriate way [...]”</p>	<ul style="list-style-type: none"> - Communication vehicles are efficient. - Communication vehicles are sufficient. - Communication vehicles used are appropriate. 	Identify in what way communication vehicles are used.	Communication vehicles

Source: Own elaboration.

Table IV.3 shows the results of the interviews with teachers, which were defined in the interview script, with regard to Block III.

Table IV.3 – Results of interviews with teachers – Role of internal communication

INITIAL CATEGORIES	INTERMEDIATE CATEGORIES	MAIN IDEA	FINAL CATEGORIES
<p>“[...] Enables involvement [...]”</p> <p>“[...] Adhere to the mission / objectives of the school [...]”</p> <p>“[...] Communication well done – involves all [...]”</p> <p>“[...] Proper communication – degree of involvement increases [...]”</p> <p>“[...] Involvement in a common project [...]”</p>	<ul style="list-style-type: none"> - Adhere to the mission and objectives. - Involvement common project. - Involvement of all. - Degree of involvement and participation. 	The utility and role that internal communication has in the life of teachers.	Role of internal communication

Source: Own elaboration.

Table IV.4 shows the results of the interviews with teachers, which were defined in the interview script, with regard to Block IV.

Table IV.4 – Results of interviews with teachers – Democratisation and opening of school board

INITIAL CATEGORIES	INTERMEDIATE CATEGORIES	MAIN IDEA	FINALS CATEGORIES
<p>“[...] <i>It is relatively easy to talk to management or other people who have coordinating positions [...]</i>”</p> <p>“[...] <i>Not always my opinions are accepted / fulfilled [...]</i>”</p> <p>“[...] <i>I feel free to express some opinions that are different from the management ones [...]</i>”</p> <p>“[...] <i>Sometimes communication is bureaucratic [...]</i>”</p>	<ul style="list-style-type: none"> - Internal communication is easy. - Internal communication is bureaucratic. - Give different opinions from the school board. - Suggestions are accepted / fulfilled. 	<p>Identify how communication is made between people from different hierarchical levels, specifically the school board.</p>	<p>Democratisation and opening of the school board</p>

Source: Own elaboration.

Table IV.5 shows the results of the interviews with teachers, which were defined in the interview script, with regard to Block V.

Table IV.5 – Results of interviews with teachers – Levels of satisfaction

INITIAL CATEGORIES	INTERMEDIATE CATEGORIES	MAIN IDEA	FINALS CATEGORIES
<p>“[...] <i>Allows me to be satisfied when I know the main or most relevant subjects of the school [...]</i>”</p> <p>“[...] <i>Lack of communication causes me dissatisfaction [...]</i>”</p> <p>“[...] <i>Inexistence of communication makes my satisfaction levels decrease [...]</i>”</p>	<ul style="list-style-type: none"> - Satisfied to know the main or most relevant subjects of the school. - Lack of communication causes me dissatisfaction. - Inexistence of communication makes my satisfaction levels decrease. 	<p>Knowing the levels of satisfaction of teachers when related to internal communication and circulation of information.</p>	<p>Levels of satisfaction</p>

Source: Own elaboration.

Table IV.6 shows the results of the interviews to teachers, which were defined in the interview script, with regard to Block VI.

Table IV.6 – Results of interviews with teachers – Other comments

INITIAL CATEGORIES	INTERMEDIATE CATEGORIES	MAIN IDEA	FINALS CATEGORIES
<p>“[...] <i>Reaction of rejection to new situations – e.g., Moodle Platform [...]</i>”</p> <p>“[...] <i>Little use of the Moodle Platform [...]</i>”</p> <p>“[...] <i>More teachers should use the Moodle Platform [...]</i>”</p> <p>“[...] <i>Institutional email for teachers [...]</i>”</p> <p>“[...] <i>Better communication depends on who issues and who is available to receive [...]</i>”</p> <p>“[...] <i>Training teachers to use the Moodle Platform [...]</i>”</p>	<ul style="list-style-type: none"> - Use the Moodle Platform. - Communication depends on who issues and who is available to receive. 	<p>Other elements that have a consequence in the internal communication of the school.</p>	<p>Other comments</p>

Source: Own elaboration.

4.3. Questionnaire

In a population of 122,452¹ teachers, the questionnaire was applied to 53 Portuguese Public Schools in the months of February, March and April 2017 to the teachers and the number of valid responses was 191.

The questionnaire was divided into three parts, namely:

Part I – Socio-demographic and professional section;

Part II – Use and efficiency of communication vehicles;

Part III – Internal Communication.

¹ Source: PORDATA (2017a).

4.3.1. Results and Discussion

4.3.1.1. Part I – Socio-demographic and professional section

The number of valid responses was 191. Table IV.7 shows the number of responses by gender.

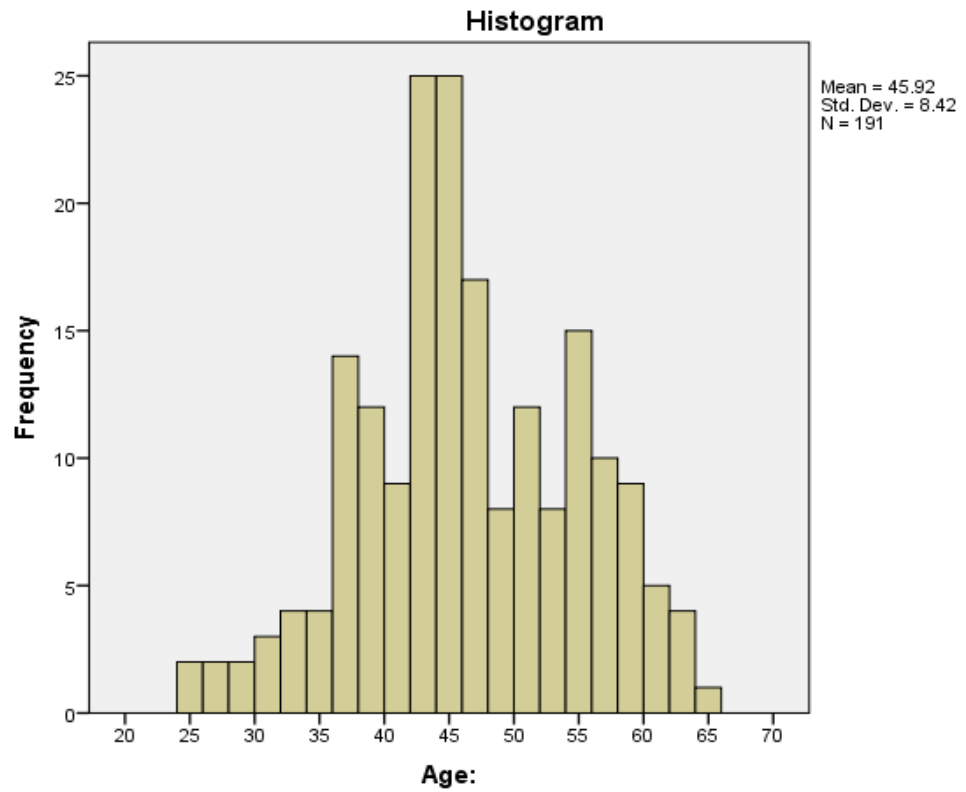
Table IV.7 – Number of responses of teachers by gender

	Number of responses	%
Female	143	74.87%
Male	48	25.13%
Total	191	100.00%

Source: Own elaboration.

In terms of gender, and according to the above table, the sample consists of 74.87% female and 25.13% male respondents.

The age distribution of teachers is between 25 and 64 years of age, with a mean age of 45.92.

Figure IV.3 – Age distribution of teachers

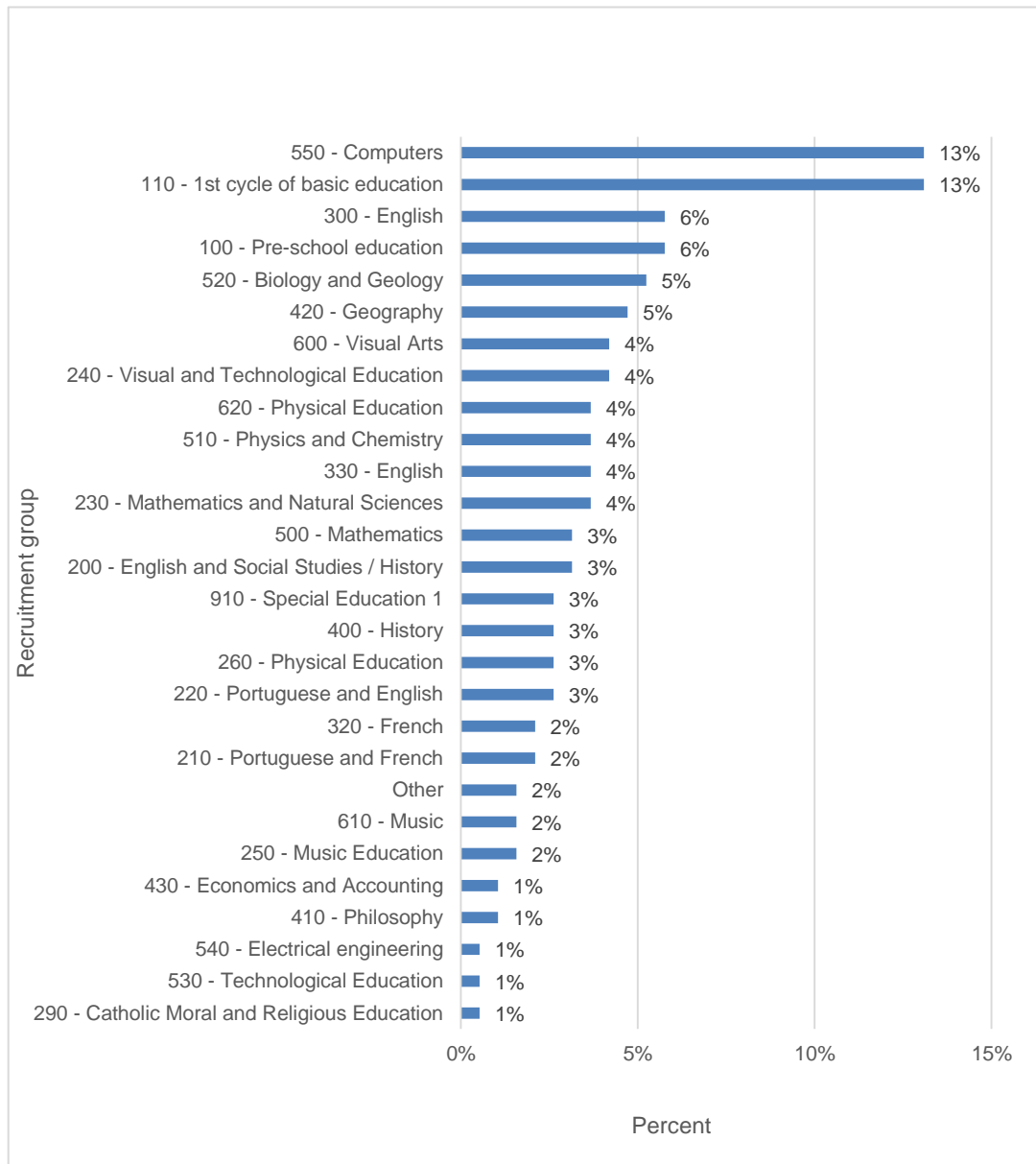
Source: Own elaboration.

Table IV.8 and Graph IV.1 show the number of responses and the percentage of teachers by the recruitment group.

Table IV.8 – Number of responses of teachers per recruitment group

Recruitment groups	Number of responses	%
530 – Technological Education	1	0.5%
540 – Electrical engineering	1	0.5%
290 – Catholic Moral and Religious Education	1	0.5%
430 – Economics and Accounting	2	1.0%
410 – Philosophy	2	1.0%
Other	3	1.6%
610 – Music	3	1.6%
250 – Music Education	3	1.6%
320 – French	4	2.1%
210 – Portuguese and French	4	2.1%
910 – Special Education 1	5	2.6%
400 – History	5	2.6%
260 – Physical Education	5	2.6%
220 – Portuguese and English	5	2.6%
500 – Mathematics	6	3.1%
200 – English and Social Studies / History	6	3.1%
620 – Physical Education	7	3.7%
510 – Physics and Chemistry	7	3.7%
330 – English	7	3.7%
230 – Mathematics and Natural Sciences	7	3.7%
600 – Visual Arts	8	4.2%
240 – Visual and Technological Education	8	4.2%
420 – Geography	9	4.7%
520 – Biology and Geology	10	5.2%
300 – Portuguese	11	5.8%
100 – Pre-school education	11	5.8%
550 – Computers	25	13.1%
110 – 1 st cycle of basic education	25	13.1%
Total	191	100.0%

Source: Own elaboration.

Graph IV.I – Number of responses in percentage of teachers per recruitment group

Source: Own elaboration.

The recruitment groups with the highest number of responses were Computers and 1st Cycle of Basic Education, with a 13% each, followed by Pre-school Education and Portuguese, with a 6% each.

Then, with a 5% for each, there are the Geography and Biology and Geology groups.

The Mathematics and Natural Sciences, English, Physics and Chemistry, Physical Education (620), Visual and Technological Education and Visual Arts groups had a 4% response.

With a response of 3% for each one are the groups of Portuguese and English, Physical Education (260), History, Special Education 1, English and Social Studies/ History and Mathematics.

The Music Education, French, Other, Portuguese and French and Music recruitment groups had a 2% response each.

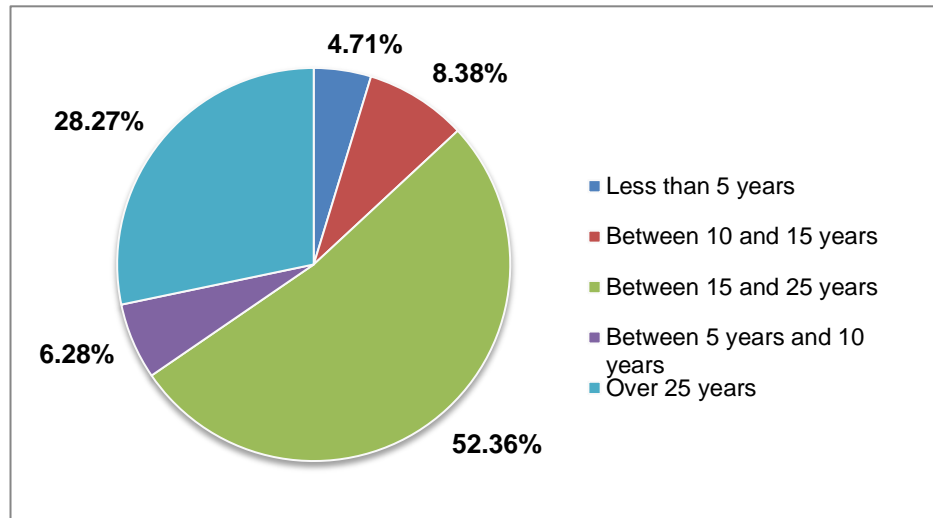
Finally, with a response of 1%, there are the following recruitment groups: Catholic Moral and Religious Education, Technological Education, Electrical Engineering, Philosophy and Economics and Accounting.

Regarding the teachers' years of service, there are two predominant classes, namely: Between 15 and 25 years and Over 25 years, with 52.36% and 28.27%, respectively. Table IV.9 and Graph IV.II shows the number of responses and the percentage.

Table IV.9 – Number of responses of teachers per years of service

Years of service	Number of responses	%
Less than 5 years	9	4.71%
Between 10 and 15 years	16	8.38%
Between 15 and 25 years	100	52.36%
Between 5 years and 10 years	12	6.28%
Over 25 years	54	28.27%
Total	191	100.00%

Source: Own elaboration.

Graph IV.II – Number of responses in percentage of teachers per years of service

Source: Own elaboration.

In terms of educational qualifications, the majority of teachers have hold a Master's Degree and Graduation, with 47.64% and 42.93%, respectively.

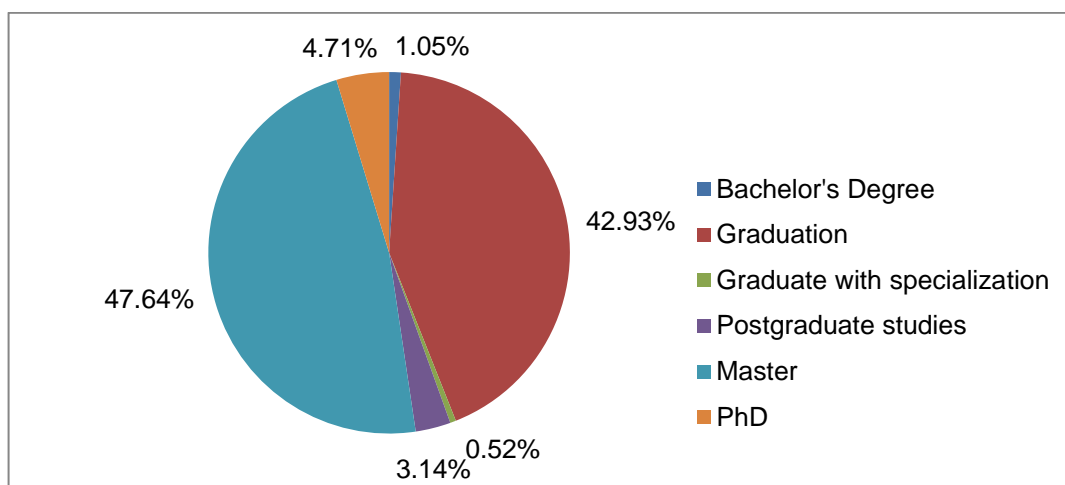
The remaining teachers have the following qualifications: PhD Degree, Postgraduate studies, Bachelor's Degree and Graduation with specialisation, with 4.71%, 3.14%, 1.05% and 0.52%, correspondingly (see Table IV.10 and Graph IV.III).

Table IV.10 – Number of responses of teachers per educational qualifications

Educational qualification	Number of responses	%
Bachelor's Degree	2	1.05%
Graduation	82	42.93%
Graduation with specialisation	1	0.52%
Postgraduate studies	6	3.14%
Master's Degree	91	47.64%
PhD Degree	9	4.71%
Total	191	100.00%

Source: Own elaboration.

Graph IV.III – Number of responses in percentage of teachers per educational qualifications



Source: Own elaboration.

With respect to the teachers' professional situation, the majority is Teacher with place in the school board, followed by Contracted teacher, with 79.06% and 15.18%, respectively.

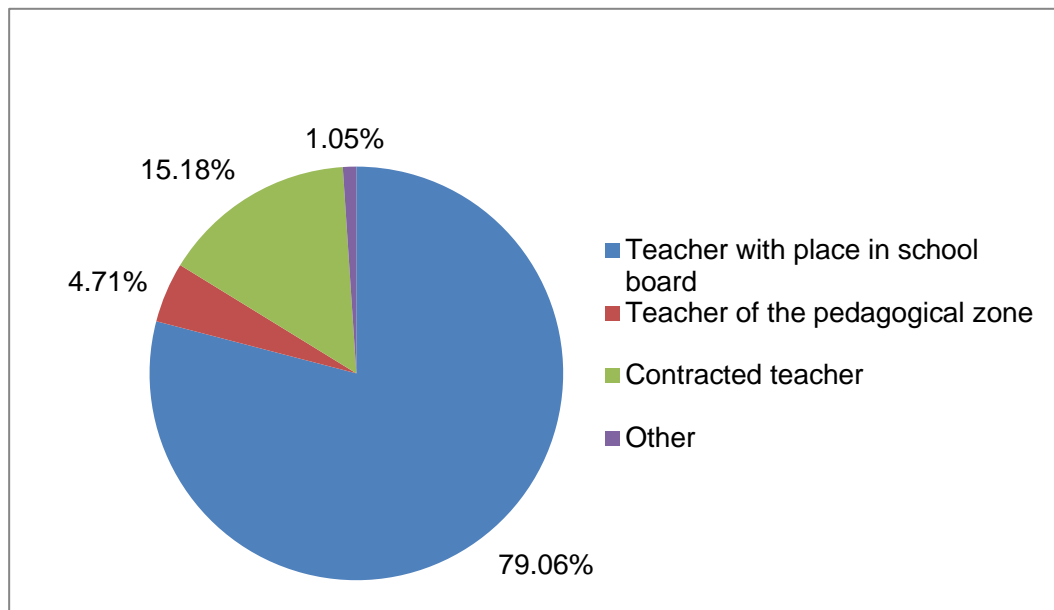
The remaining teachers are Teacher of the pedagogical zone and another situation, respectively, with 4.71% and 1.05% (See Table IV.11 and Graph IV.IV).

Table IV.11 – Number of responses of teachers per professional situation

Professional situation	Number of responses	%
Teacher with place in school board	151	79.06%
Teacher of the pedagogical zone	9	4.71%
Contracted teacher	29	15.18%
Other	2	1.05%
Total	191	100.00%

Source: Own elaboration.

Graph IV.IV – Number of responses in percentage of teachers per professional situation



Source: Own elaboration.

4.3.1.2. Part II – Use and efficiency of communication vehicles

Part II of the questionnaire had two questions, namely:

1. Using a scale where 1 corresponds to “Never” and 5 corresponds to “Always”, how often do you use the following media/communication vehicles in your school?
2. Using a scale where 1 corresponds to “Not efficient at all” and 5 corresponds to “Very efficient”, how do you rate the following media/communication vehicles in your school?

Table IV.12 shows the number of responses of teachers to the first question – frequency of use of communication vehicles in school. In light grey, the most frequent responses (mode) are shown.

Table IV.12 – Number of responses of teachers per frequency of use of communication vehicles in school

Communication vehicles		Never 1	Rarely 2	Sometimes 3	Often 4	Always 5	Total
In-person meetings	N	0	2	25	88	76	191
	%	0.0%	1.0%	13.1%	46.1%	39.8%	
Placards	N	7	11	40	76	57	191
	%	3.7%	5.8%	20.9%	39.8%	29.8%	
Moodle Platform	N	41	20	73	42	15	191
	%	21.5%	10,5%	38.2%	22.0%	7.9%	
E-mail	N	0	0	2	66	123	191
	%	0.0%	0.0%	1.0%	34.6%	64.4%	
School Website	N	16	44	58	46	27	191
	%	8.4%	23.0%	30,4%	24.1%	14.1%	
School Facebook	N	92	29	31	36	3	191
	%	48.2%	15.2%	16,2%	18.8%	1.6%	

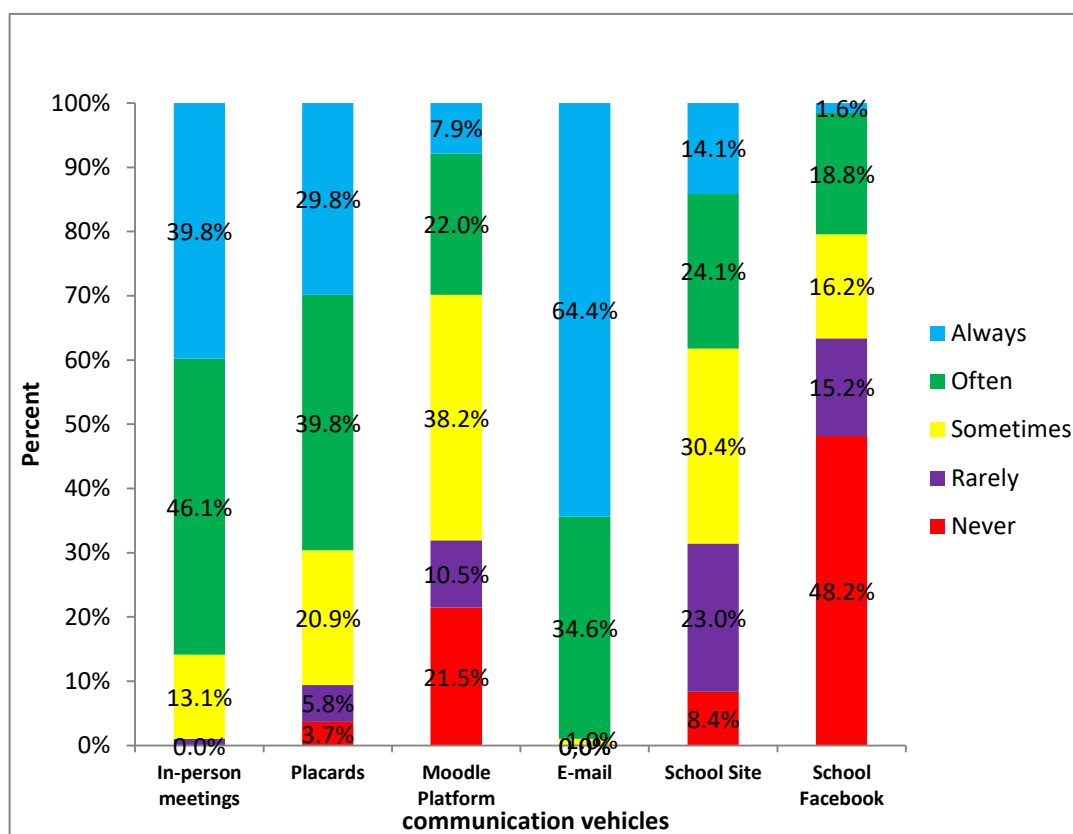
Source: Own elaboration.

Regarding the use of the communication vehicles, the following is verified:

- In-person meetings – with a response of 46.1%, 39.8% and 13.1% are, respectively, *often*, *always* and *sometimes*. With 0.0% and 1.0%, the responses *never* and *rarely* are reported, respectively.
- Placards – the predominant answers are *often*, *always* and *sometimes*, with a response, respectively, of 39.8%, 29.8% and 20.9%. *Never* and *rarely* had a response of 3.7% and 5.8%, respectively.
- Moodle Platform – the answers with the highest percentage are *sometimes*, *often* and *never*, referring to 38.2%, 22.0% and 21.5%. The *rarely* and *always* answers have, respectively, 10.5% and 7.9%.
- E-mail – the major answers are *always* and *often*, with a response, respectively, of 64.4% and 34.6%. *Sometimes* has a response of 1.0%, while *never* and *rarely* have a response of 0%.

- School Website – the predominant answers are *sometimes*, *often* and *rarely*, with, respectively, 30.4%, 24.1% and 23.0%. *Always* and *never* have a response of 14.1% and 8.4%, respectively.
- School Facebook – the answers with the highest percentage were *never*, *often*, *sometimes* and *rarely*, with 48.2%, 18.8%, 16.2% and 15.2%, respectively. *Always* has a response of 1.6% (see Graph IV.V).

Graph IV.V – Number of responses in percentage of teachers per frequency of use of communication vehicles in school



Source: Own elaboration.

Table IV.13 shows the number of responses of teachers to the second question – classification of the efficiency of communication vehicles in school. In light grey, the most frequent responses (mode) are shown.

Table IV.13 – Number of responses of teachers per classification of the efficiency of communication vehicles in school

Communication vehicles		Not efficient at all	Poorly efficient	More or less efficient	Efficient	Very efficient	Total
		1	2	3	4	5	
In-person meetings	N	0	3	41	118	29	191
	%	0.0%	1.6%	21.5%	61.8%	15.2%	
Placards	N	8	9	39	101	34	191
	%	4.2%	4.7%	20.4%	52.9%	17.8%	
Moodle Platform	N	23	30	47	72	19	191
	%	12.0%	15.7%	24.6%	37.7%	9.9%	
E-mail	N	0	4	10	68	109	191
	%	0.0%	2.1%	5.2%	35.6%	57.1%	
School Site	N	4	37	53	75	22	191
	%	2.1%	19.4%	27.7%	39.3%	11.5%	
School Facebook	N	61	38	45	38	9	191
	%	31.9%	19.9%	23.6%	19.9%	4.7%	

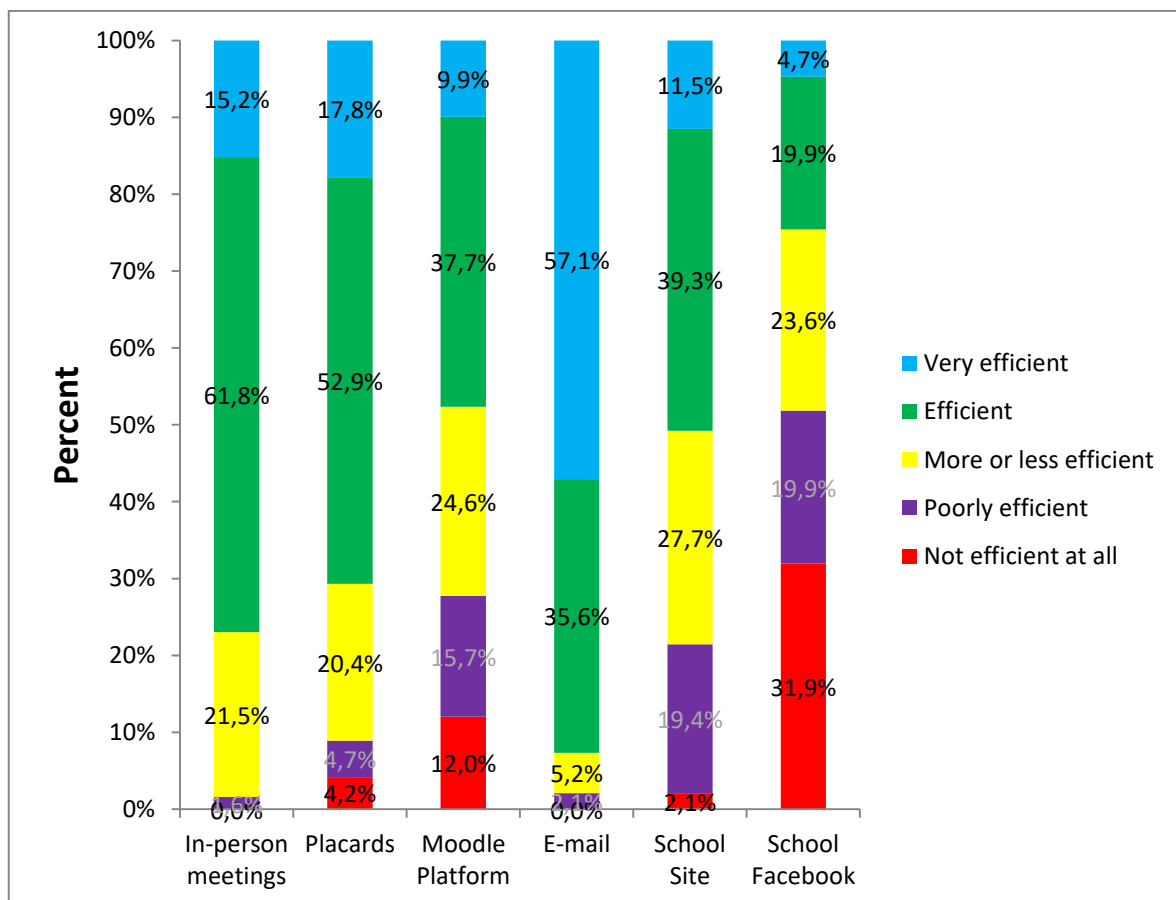
Source: Own elaboration.

With regard of to the classification of the efficiency of communication vehicles in school, teachers consider the following:

- In-person meetings – the predominant answers are *efficient*, *more or less efficient* and *very efficient*, with, respectively, 61.8%, 21.5% and 15.2%. *Poorly efficient* and *not efficient at all* have a response of 1.6% and 0.0%, respectively.
- Placards – The answers with the highest percentage are *efficient*, *more or less efficient* and *very efficient*, with a response of 52.9%, 20.4% and 17.8%, respectively. The *poorly efficient* and the *not efficient at all* answers have, respectively, a 4.7% and 4.2% response.
- Moodle Platform – With a response of 37.7%, 24.6% and 15.7%, it is classified, respectively, *efficient*, *more or less efficient* and *poorly efficient*. The options *efficient* and *very efficient* have 12.0% and 9.9% of the responses, respectively.

- E-mail – The answers with the highest percentage are *very efficient* and *efficient*, with 57.1% and 35.6%, respectively. The *more or less efficient*, *poorly efficient* and *not efficient at all* responses have, respectively, 5.2%, 2.1% and 0.0%.
- School Website – The predominant answers are *efficient*, *more or less efficient* and *poorly efficient*, with, respectively, 39.3%, 27.7% and 19.4%. *Very efficient* and *not efficient at all* have a response of 11.5% and 2.1%.
- School Facebook – The options *not efficient at all* and *more or less efficient* have the highest scores, with a response of 31.9% and 23.6%, respectively. In turn, the options *poorly efficient* and *efficient* have response of 19.9%, whereas the *very efficient* option have a response of 4.7% (see Graph IV.VI).

Graph IV.VI – Number of responses in percentage of teachers per classification of the efficiency of communication vehicles in school



Source: Own elaboration.

Summary

Table IV.14 presents a summary of the teachers' responses regarding use the communication vehicles in school.

Table IV.14 – Average of use the communication vehicles in school

	In-person meetings	Placards	Moodle Platform	E-mail	School Website	School Facebook
Total	191.0	191.0	191.0	191.0	191.0	191.0
Average	4.2	3.9	2.8	4.6	3.1	2.1

Source: Own elaboration.

The most used communication vehicle by teachers is the e-mail, followed by in-person meetings, with a mean of 4.6 and 4.2, respectively. The average use of the e-mail is very close to *always*, while in-person meetings are *often*.

The following communication vehicles used by the teachers are placards and the school website, with an average of 3.9 and 3.1, respectively. The average use of placards is *almost often*, the school website is used *sometimes*. The Moodle Platform has an average use of 2.8, being very close to *sometimes*.

The communication vehicle that emerges with least use is the School Facebook, with an average of 2.1, meaning *rarely* (see Table IV.15).

Table IV.15 – Average of efficiency of communication vehicles in school

	In-person meetings	Placards	Moodle Platform	E-mail	School Website	School Facebook
Total	191.0	191.0	191.0	191.0	191.0	191.0
Average	3.9	3.8	3.2	4.5	3.4	2.5

Source: Own elaboration.

The analysis of the table above allows concluding that the most efficient in-school communication vehicles are: e-mail, with an average of 4.5, which is very close to *very efficient*, and the in-person meetings, with an average of 3.9, which is *almost efficient*. Next, the teachers consider the placards, with an average of 3.8, the most efficient communication vehicle.

For teachers, the more or less efficient vehicles are the school website and the Moodle Platform, with an average, respectively, of 3.4 and 3.2. The least efficient communication vehicle, according to teachers, is the school Facebook, with an average of 2.5.

4.3.1.3. Part III – Internal Communication

Part III of the questionnaire had 29 questions in total. A 5 point Likert scale was applied, in which:

- 1 refers to Totally disagree
- 2 refers to Disagree
- 3 refers to I neither agree nor disagree
- 4 refers to I agree
- 5 refers to I totally agree

As mentioned, this part of the questionnaire had 29 questions², but it was decided to exclude two questions because each of these questions was part of two factors each; that is, each of these factors was composed of a question. As such, we withdrew them and proceeded to the accomplishment of the factor analysis without these two variables.

Thus, a factor analysis was performed with 27 questions.

² The factor analysis with the 29 questions is available in Appendix C – Factor analysis with 29 questions.

The statistics were obtained through the IBM SPSS Statistics Version 24 64 bit edition.

Table IV.16 presents the questions made in the questionnaire and the corresponding variables used in data processing.

Table IV.16 – Variables used in data processing

Construct	Variables	Questions
Moodle Platform as communication vehicle	MoodleCommunicateVehicle1	The Moodle Platform has a simple interface.
	MoodleCommunicateVehicle2	I consider that it is easy to use the Moodle Platform.
	MoodleCommunicateVehicle3	The Moodle Platform is a useful communication vehicle.
	MoodleCommunicateVehicle4	The Moodle Platform allows managing and building organisational knowledge.
	MoodleCommunicateVehicle5	The Moodle Platform can improve internal communication among colleagues.
	MoodleCommunicateVehicle6	The Moodle Platform can improve internal communication with the management.
	MoodleCommunicateVehicle7	I use the Moodle Platform to consult information (regulations, schedules, minutes, etc.) of the school.
Active use of the Moodle Platform	MoodleUse1	I use the Moodle Platform to communicate and interact with colleagues.
	MoodleUse2	I use the Moodle Platform to communicate and interact with the school board.
	MoodleUse3	I use the Moodle platform for pedagogical work with students.
	MoodleUse4	I use the Moodle platform to communicate and interact with students.

Table IV.17- Variables used in data processing (Cont.)

Construct	Variables	Questions
Communication vehicles	CommunicationVehicles1	The communication vehicles available in my school are sufficient.
	CommunicationVehicles2	In my school the available communication vehicles are efficient.
	CommunicationVehicles3	The communication vehicles in my school are appropriate.
	CommunicationVehicles4	I feel that in my school the communication vehicles are used appropriately.
	CommunicationVehicles5	I feel that there is adequate internal communication in my school.
Role of internal communication	RoleCommunication1	I think my degree of involvement and participation in my school's educational project increases if internal communication is appropriate.
	RoleCommunication2	I think that proper internal communication allows me better adhere to the objectives of my school, in a common project involving all.
	RoleCommunication3	I think that adequate internal communication is a decisive factor for my involvement and participation in my school.
	RoleCommunication4	I think that my degree of involvement and participation in my school increases if internal communication is adequate.

Table IV.18- Variables used in data processing (Cont.)

Construct	Variables	Questions
Levels of satisfaction	LevelSatisf1	My level of satisfaction increases when I am informed about most of the subjects in my school.
	LevelSatisf2	My level of satisfaction increases when I am informed about the most relevant subjects of my school.
	LevelSatisf3	In my school a proper communication makes my levels of satisfaction increase.
	LevelSatisf4	In my school when there is a lack of communication I have a feeling of dissatisfaction.
Democratisation and opening of school board	DemocratDirection1	In my school it is easy to talk to the school board.
	DemocratDirection2	In my school I feel free to give opinions different from those of the school board.
	DemocratDirection3	In my school, in general, my suggestions are accepted by the school board.

Source: Own elaboration.

The following tables depict the teachers' answers by construct. In light grey, the most frequent responses (mode) are shown (Tables IV.17 to IV.22).

Table IV.19 – Number of teachers' responses concerning the Moodle Platform as communication vehicle

		I totally disagree	I disagree	I neither agree nor disagree	I agree	I totally agree
		1	2	3	4	5
MoodleCommunicateVehicle1	N	3	23	51	99	15
	%	1.57%	12.04%	26.70%	51.83%	7.85%
MoodleCommunicateVehicle2	N	9	17	48	88	29
	%	4.71%	8.90%	25.13%	46.07%	15.18%
MoodleCommunicateVehicle3	N	2	17	55	90	27
	%	1.05%	8.90%	28.80%	47.12%	14.14%
MoodleCommunicateVehicle4	N	7	11	68	79	26
	%	3.66%	5.76%	35.60%	41.36%	13.61%
MoodleCommunicateVehicle5	N	12	21	72	72	14
	%	6.28%	10.99%	37.70%	37.70%	7.33%
MoodleCommunicateVehicle6	N	18	20	83	57	13
	%	9.42%	10.47%	43.46%	29.84%	6.81%
MoodleCommunicateVehicle7	N	26	25	44	70	26
	%	13.61%	13.09%	23.04%	36.65%	13.61%

Source: Own elaboration.

Table IV.20 – Number of teachers' responses concerning the Active use of the Moodle Platform

		I totally disagree	I disagree	I neither agree nor disagree	I agree	I totally agree
		1	2	3	4	5
MoodleUse1	N	54	40	47	39	11
	%	28.27%	20.94%	24.61%	20.42%	5.76%
MoodleUse2	N	44	41	52	47	7
	%	23.04%	21.47%	27.23%	24.61%	3.66%
MoodleUse3	N	47	43	43	42	16
	%	24.61%	22.51%	22.51%	21.99%	8.38%
MoodleUse4	N	46	37	49	43	16
	%	24.08%	19.37%	25.65%	22.51%	8.38%

Source: Own elaboration.

Table IV.21 – Number of teachers' responses concerning Communication vehicles

		I totally disagree	I disagree	I neither agree nor disagree	I agree	I totally agree
		1	2	3	4	5
CommunicationVehicles1	N	3	25	28	117	18
	%	1.57%	13.09%	14.66%	61.26%	9.42%
CommunicationVehicles2	N	5	13	48	110	15
	%	2.62%	6.81%	25.13%	57.59%	7.85%
CommunicationVehicles3	N	3	13	33	123	19
	%	1.57%	6.81%	17.28%	64.40%	9.95%
CommunicationVehicles4	N	2	31	50	100	8
	%	1.05%	16.23%	26.18%	52.36%	4.19%
CommunicationVehicles5	N	3	27	51	103	7
	%	1.57%	14.14%	26.70%	53.93%	3.66%

Source: Own elaboration.

Table IV.22 – Number of teachers' responses concerning the Role of internal communication

		I totally disagree	I disagree	I neither agree nor disagree	I agree	I totally agree
		1	2	3	4	5
RoleCommunication1	N	2	16	18	117	38
	%	1.05%	8.38%	9.42%	61.26%	19.90%
RoleCommunication2	N	1	6	16	112	56
	%	0.52%	3.14%	8.38%	58.64%	29.32%
RoleCommunication3	N	2	21	28	103	37
	%	1.05%	10.99%	14.66%	53.93%	19.37%
RoleCommunication4	N	1	10	12	101	67
	%	0.52%	5.24%	6.28%	52.88%	35.08%

Source: Own elaboration.

Table IV.23 – Number of teachers' responses concerning the Levels of satisfaction

		I totally disagree	I disagree	I neither agree nor disagree	I agree	I totally agree
		1	2	3	4	5
LevelSatisf1	N	1	0	19	126	45
	%	0.52%	0.00%	9.95%	65.97%	23.56%
LevelSatisf2	N	1	0	18	116	56
	%	0.52%	0.00%	9.42%	60.73%	29.32%
LevelSatisf3	N	2	2	29	110	48
	%	1.05%	1.05%	15.18%	57.59%	25.13%
LevelSatisf4	N	1	16	30	111	33
	%	0.52%	8.38%	15.71%	58.12%	17.28%

Source: Own elaboration.

Table IV.24 – Number teachers' responses concerning Democratisation and opening of the school board

		I totally disagree	I disagree	I neither agree nor disagree	I agree	I totally agree
		1	2	3	4	5
DemocratDirection1	N	5	24	23	101	38
	%	2.62%	12.57%	12.04%	52.88%	19.90%
DemocratDirection2	N	11	18	37	88	37
	%	5.76%	9.42%	19.37%	46.07%	19.37%
DemocratDirection3	N	7	22	65	85	12
	%	3.66%	11.52%	34.03%	44.50%	6.28%

Source: Own elaboration.

Then, the average was calculated and the standard deviation of the 27 questions of the questionnaire was applied. Table IV.23 shows the results obtained.

Table IV.25 – Average and the standard deviation of the 27 questions

Variable	N	AVERAGE	STANDARD DEVIATION
MoodleCommunicateVehicle1	191	3.52	0.863
MoodleCommunicateVehicle2	191	3.58	1.007
MoodleCommunicateVehicle3	191	3.64	0.870
MoodleCommunicateVehicle4	191	3.55	0.927
MoodleCommunicateVehicle5	191	3.29	0.976
MoodleCommunicateVehicle6	191	3.14	1.019
MoodleCommunicateVehicle7	191	3.24	1.241
MoodleUse1	191	2.54	1.255
MoodleUse2	191	2.64	1.187
MoodleUse3	191	2.67	1.290
MoodleUse4	191	2.72	1.283
CommunicationVehicles1	191	3.64	0.883
CommunicationVehicles2	191	3.61	0.831
CommunicationVehicles3	191	3.74	0.790
CommunicationVehicles4	191	3.42	0.848
CommunicationVehicles5	191	3.44	0.837
RoleCommunication1	191	3.91	0.847
RoleCommunication2	191	4.13	0.732
RoleCommunication3	191	3.80	0.915
RoleCommunication4	191	4.17	0.803
LevelSatisf1	191	4.12	0.608
LevelSatisf2	191	4.18	0.635
LevelSatisf3	191	4.05	0.735
LevelSatisf4	191	3.83	0.829
DemocratDirection1	191	3.75	1.000
DemocratDirection2	191	3.64	1.076
DemocratDirection3	191	3.38	0.904

Source: Own elaboration.

The results from the table above show that:

- The variables MoodleCommunicateVehicle1, MoodleCommunicateVehicle2, MoodleCommunicateVehicle3, MoodleCommunicateVehicle4, MoodleCommunicateVehicle5, MoodleCommunicateVehicle6 and MoodleCommunicateVehicle7 have a total average of 3.42;
- The variables MoodleUse1, MoodleUse2, MoodleUse3 and MoodleUse4 have a total average of 2.64;

- The variables CommunicationVehicles1, CommunicationVehicles2, CommunicationVehicles3, CommunicationVehicles4 and CommunicationVehicles5 have a total average of 3.57;
- The variables RoleCommunication1, RoleCommunication2, RoleCommunication3 and RoleCommunication4 have a total average of 4.00;
- The variables LevelSatisf1, LevelSatisf2, LevelSatisf3 and LevelSatisf4 have a total average of 4.05;
- The variables DemocratDirection1, DemocratDirection2 and DemocratDirection3 have a total average of 3.59.

Subsequently, multivariate factor analysis was performed, using principal components – correlation matrix – varimax rotation.

To check the consistency of the original data, the Kaiser's measure test of sampling adequacy (KMO) was applied. The overall KMO value is 0.760.

The Bartlett's test of sphericity allows to conclude for the appropriateness of these data for factor analysis (p-value <0.00001) (see Table IV.24).

Table IV.26 – KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.760
	Approx. Chi-Square	3952.603
Bartlett's Test of Sphericity	df	351
	Sig.	0.000

Source: Own elaboration.

After the validation of the factor analysis was done through the KMO (0.760) and the Bartlett's test (significant, $p = .000$), the result indicates that these values are acceptable for their pursuit.

Table IV.25 shows Initial Eigenvalues and the variance explained by each factor, along with the cumulative variance. The six factors explain an accumulated share of 71.995% of the total variance.

Table IV.27 – Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.951	25.746	25.746	6.951	25.746	25.746	4.616	17.094	17.094
2	4.644	17.199	42.945	4.644	17.199	42.945	3.614	13.385	30.479
3	3.100	11.481	54.426	3.100	11.481	54.426	3.222	11.932	42.411
4	1.733	6.418	60.844	1.733	6.418	60.844	2.799	10.366	52.777
5	1.634	6.050	66.894	1.634	6.050	66.894	2.740	10.148	62.925
6	1.377	5.101	71.995	1.377	5.101	71.995	2.449	9.070	71.995
7	0.999	3.700	75.695						
8	0.761	2.819	78.514						
9	0.708	2.622	81.136						
10	0.624	2.312	83.448						
11	0.572	2.119	85.567						
12	0.509	1.886	87.453						
13	0.461	1.707	89.160						
14	0.413	1.531	90.690						
15	0.369	1.367	92.057						
16	0.345	1.278	93.335						
17	0.294	1.088	94.423						
18	0.265	0.982	95.405						
19	0.245	0.906	96.311						
20	0.219	0.810	97.121						
21	0.193	0.716	97.838						
22	0.143	0.528	98.366						
23	0.135	0.499	98.865						
24	0.114	0.421	99.285						
25	0.086	0.320	99.605						
26	0.080	0.298	99.903						
27	0.026	0.097	100.000						

Extraction Method: Principal Component Analysis.

Source: Own elaboration.

Table IV.26 shows the Rotated Component Matrix for each question from the questionnaire, presenting all variables that are higher than 0.5 and may be grouped by “category”.

Table IV.28 – Rotated Component Matrix

	Component					
	1	2	3	4	5	6
MoodleCommunicateVehicle1	0.882	0.084	0.042	0.152	-0.018	0.036
MoodleCommunicateVehicle2	0.863	0.191	0.079	0.088	0.008	0.005
MoodleCommunicateVehicle3	0.846	0.265	-0.043	0.011	0.006	0.009
MoodleCommunicateVehicle4	0.825	0.218	-0.050	-0.047	0.095	-0.053
MoodleCommunicateVehicle5	0.689	0.371	-0.074	0.039	-0.013	0.093
MoodleCommunicateVehicle6	0.638	0.498	0.039	-0.016	-0.094	0.088
MoodleCommunicateVehicle7	0.572	0.524	0.191	0.075	-0.089	-0.039
MoodleUse1	0.199	0.870	0.102	0.075	0.006	0.082
MoodleUse2	0.292	0.849	0.115	0.048	0.013	0.019
MoodleUse3	0.366	0.801	-0.036	-0.098	0.002	0.063
MoodleUse4	0.399	0.768	0.031	-0.072	-0.003	0.069
CommunicationVehicles1	0.053	0.041	0.809	0.143	-0.036	0.111
CommunicationVehicles2	-0.020	0.020	0.799	0.041	-0.032	0.223
CommunicationVehicles3	0.062	0.073	0.760	-0.075	0.177	0.078
CommunicationVehicles4	-0.040	0.113	0.756	0.010	0.073	-0.040
CommunicationVehicles5	-0.001	-0.031	0.712	-0.008	0.078	0.376
RoleCommunication1	0.128	0.003	0.007	0.833	0.290	0.094
RoleCommunication2	0.068	-0.014	0.035	0.822	0.297	0.123
RoleCommunication3	0.108	0.120	0.120	0.795	0.021	-0.057
RoleCommunication4	-0.080	-0.106	-0.063	0.712	0.128	0.181
LevelSatisf1	0.028	-0.032	0.172	0.189	0.826	0.029
LevelSatisf2	0.027	-0.086	0.055	0.243	0.824	-0.110
LevelSatisf3	-0.006	0.011	0.161	0.270	0.757	0.139
LevelSatisf4	-0.061	0.065	-0.109	0.009	0.722	0.219
DemocratDirection1	-0.062	0.020	0.179	0.096	0.060	0.850
DemocratDirection2	0.116	0.033	0.188	0.116	0.073	0.846
DemocratDirection3	0.041	0.151	0.181	0.089	0.114	0.788

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.

Source: Own elaboration.

So as to check the reliability of the questionnaire, a Cronbach's Coefficient Alpha was calculated.

Table IV.27 shows the Cronbach Coefficient Alpha's test, where Cronbach's Alpha values are above 0.8, indicating that the correlations among the variables are strong enough to be part of it.

Table IV.29- Cronbach Coefficient Alpha of all variables

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.875	0.869	27

Source: Own elaboration.

Tables Table IV.30 to Table IV.409 show the Cronbach Coefficient Alpha of the six factors individually.

The Cronbach Coefficient Alpha was also calculated for each factor, which allowed the analysis of each factor individually, and values above 0.7 were obtained, indicating that the variables are strong enough to be part of each factor analysed.

Table IV.30 – Cronbach Coefficient Alpha of factor 1

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.916	0.922	7

Source: Own elaboration.

Table IV.31 – Cronbach Coefficient Alpha with Deleted Variables of factor 1

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
MoodleCommunicateVehicle1	20.45	24.922	0.755	0.769	0.903
MoodleCommunicateVehicle2	20.39	23.502	0.785	0.780	0.899
MoodleCommunicateVehicle3	20.32	24.410	0.816	0.722	0.898
MoodleCommunicateVehicle4	20.41	24.202	0.781	0.715	0.900
MoodleCommunicateVehicle5	20.68	24.292	0.720	0.756	0.906
MoodleCommunicateVehicle6	20.83	23.723	0.747	0.714	0.903
MoodleCommunicateVehicle7	20.73	22.744	0.667	0.516	0.917

Source: Own elaboration.

Table IV.32 – Cronbach Coefficient Alpha of factor 2

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.916	0.916	4

Source: Own elaboration.

Table IV.33 – Cronbach Coefficient Alpha with Deleted Variables of factor 2

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
MoodleUse1	8.03	11.936	0.763	0.753	0.907
MoodleUse2	7.93	12.169	0.791	0.756	0.898
MoodleUse3	7.91	11.138	0.851	0.926	0.876
MoodleUse4	7.86	11.311	0.831	0.923	0.883

Source: Own elaboration.

Table IV.34 – Cronbach Coefficient Alpha of factor 3

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.849	0.849	5

Source: Own elaboration.

Table IV.35 – Cronbach Coefficient Alpha with Deleted Variables of factor 3

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
CommunicationVehicles1	14.22	6.951	0.692	0.561	0.809
CommunicationVehicles2	14.25	7.050	0.728	0.594	0.800
CommunicationVehicles3	14.12	7.618	0.622	0.412	0.828
CommunicationVehicles4	14.43	7.468	0.597	0.378	0.834
CommunicationVehicles5	14.42	7.287	0.657	0.449	0.819

Source: Own elaboration.

Table IV.36 – Cronbach Coefficient Alpha of factor 4

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.835	0.840	4

Source: Own elaboration.

Table IV.37 – Cronbach Coefficient Alpha with Deleted Variables of factor 4

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
RoleCommunication1	12.09	3.981	0.775	0.679	0.740
RoleCommunication2	11.87	4.388	0.780	0.677	0.748
RoleCommunication3	12.20	4.258	0.588	0.371	0.831
RoleCommunication4	11.83	4.740	0.552	0.332	0.839

Source: Own elaboration.

Table IV.38 – Cronbach Coefficient Alpha of factor 5

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.816	0.829	4

Source: Own elaboration.

Table IV.39 – Cronbach Coefficient Alpha with Deleted Variables of factor 5

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
RoleCommunication1	12.09	3.981	0.775	0.679	0.740
RoleCommunication2	11.87	4.388	0.780	0.677	0.748
RoleCommunication3	12.20	4.258	0.588	0.371	0.831
RoleCommunication4	11.83	4.740	0.552	0.332	0.839

Source: Own elaboration.

Table IV.40 – Cronbach Coefficient Alpha of factor 6

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
0.846	0.846	3

Source: Own elaboration.

Table IV.41 – Cronbach Coefficient Alpha with Deleted Variables of factor 6

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
DemocratDirection1	7.02	3.168	0.745	0.577	0.753
DemocratDirection2	7.13	2.872	0.765	0.599	0.735
DemocratDirection3	7.39	3.754	0.643	0.414	0.850

Source: Own elaboration.

4.3.1.4. Hypothesis test

In order to verify if the opinion/position of teachers is in agreement or disagreement with each of the factors, it was tested whether the means of each factor were significantly different from three (3).

Three (3) is the neutral point / midpoint (in the questionnaire it corresponds to the answer to *I neither agree nor disagree*).

To do this, a T-test was performed for a sample. The results are shown in Table IV.40.

Table IV.42 – T-test

Descriptive				TEST T: Test Value = 3		
	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Factor 1	191	3.42	0.81037	7.232	190	0.000
Factor 2	191	2.64	1.12165	-4.387	190	0.000
Factor 3	191	3.57	0.66192	11.937	190	0.000
Factor 4	191	4.00	0.67619	20.438	190	0.000
Factor 5	191	4.05	0.56737	25.475	190	0.000
Factor 6	191	3.59	0.87053	9.365	190	0.000

Source: Own elaboration.

The first conclusion that may be drawn is that all factors have an average significantly different from three ($p < 0.001$).

- **Factor 1, factor 3, factor 4, factor 5 and factor 6** are significantly higher than three, that is, they are in the zone of agreement, expressing agreement on the part of the teachers.
- Factor analysis gave rise to a new factor, which is **factor 2**.
Factor 2 is significantly less than three, that is, it expresses disagreement on the part of the teachers.
- **Factor 1** aims to understand teachers' perceptions about the Moodle Platform as a vehicle of communication, being composed of seven variables that analyse the interface, ease of use, management and built organisational knowledge, the increase internal communication among colleagues and the management.

This factor includes the following questions:

- ✓ The Moodle Platform has a simple interface.
- ✓ I consider it easy to use the Moodle Platform.
- ✓ The Moodle Platform is a useful communication vehicle.
- ✓ The Moodle Platform allows managing and building organisational knowledge.
- ✓ The Moodle Platform can improve internal communication among colleagues.
- ✓ The Moodle Platform can improve internal communication with the management.
- ✓ I use the Moodle Platform to consult information (regulations, schedules, minutes, etc.) of the school.

The name of this factor is **Moodle Platform as communication vehicle**; it contains seven variables related positively with the factor, having obtained a total average of **3.42**, which is significantly higher than three, thus **confirming hypothesis 5**.

Hypothesis 5: In Portuguese Public Schools, the use of the Moodle Platform as a communication tool will positively influence the communication with teachers, as internal stakeholders.

- **Factor 2** aims to analyse how teachers use the Moodle Platform to communicate and interact with colleagues, students and management.

This factor includes the following questions:

- ✓ I use the Moodle Platform to communicate and interact with colleagues.
- ✓ I use the Moodle Platform to communicate and interact with the management.
- ✓ I use the Moodle Platform for pedagogical work with students.
- ✓ I use the Moodle Platform to communicate and interact with students.

The name of this factor is **Active use of the Moodle Platform**; contains four variables related positively with the factor, having obtained a total average of **2.64**, which is significantly less than three. Consequently, it explains that, even though **teachers** agree that the Moodle Platform is a communication tool that positively influences communication, **they do not actively use the Moodle Platform.**

- **Factor 3** – the purpose of this factor is to understand if the means of communication available are sufficient, efficient, appropriate, if they are appropriately used and if the internal communication is done properly in the school.

This factor includes the following questions:

- ✓ The means of communication available in my school are sufficient.
- ✓ In my school the available means of communication are efficient.
- ✓ The means of communication in my school are appropriate.
- ✓ I feel that in my school the communication vehicles are used appropriately.
- ✓ I feel that there is adequate internal communication in my school.

The name of this factor is **Communication vehicles**; it contains five variables related positively with the factor, having obtained a total average of **3.57**, which is significantly higher than three, thus **confirming hypothesis 3.**

Hypothesis 3: In Portuguese Public Schools, teachers, as internal stakeholders, agree that there is a good organisation of communication vehicles.

- **Factor 4** – this factor aimed at assessing whether internal communication allows involvement in school, joining the mission and standing to the objectives of stakeholders, in a joint project involving all.

This factor includes the following questions:

- ✓ I think my degree of involvement and participation in my school's educational project increases if internal communication is appropriate.
- ✓ I think that proper internal communication allows me better adhere to the objectives of my school, in a common project involving all.
- ✓ I think that adequate internal communication is a decisive factor for my involvement and participation in my school.
- ✓ I think that my degree of involvement and participation in my school increases if internal communication is adequate.

The name of this factor is **Role of Internal Communication**; it contains four variables related positively with the factor, having obtained a total average of **4.00**, which is significantly higher than three, thus **confirming hypothesis 1**.

Hypothesis 1: In Portuguese Public Schools, teachers, as internal stakeholders, agree that the role of internal communication positively influences their degree of involvement and participation.

- **Factor 5** – this factor expressed the teachers' level of satisfaction regarding their knowledge of most or of the relevant subjects in school, proper communication in school, and the feeling of dissatisfaction.

This factor includes the following questions:

- ✓ My level of satisfaction increases when I am informed about most of the subjects in my school.

- ✓ My level of satisfaction increases when I am informed about the most relevant subjects in my school.
- ✓ In my school, proper communication makes my levels of satisfaction increase.
- ✓ In my school, when there is a lack of communication, I have a feeling of dissatisfaction.

The name of this factor is **Levels of satisfaction**; it contains four variables related positively with the factor, having obtained a total average of **4.05**, which is significantly higher than three, thus **confirming hypothesis 4**.

Hypothesis 4: In Portuguese Public Schools, the levels of satisfaction of teachers, as internal stakeholders, increase as the levels of communication and circulation of information also increases.

- **Factor 6** – this factor aimed to check the opinion of teachers on the following subjects: if it is easy to talk to the school board, feel free to give different opinions from school board, and if suggestions are accepted by the school board.

This factor includes the following questions:

- ✓ In my school it is easy to talk to the school board.
- ✓ In my school I feel free to give opinions different from those of the school board.
- ✓ In my school, in general, my suggestions are accepted by the school board.

The name of this factor is **Democratisation and opening of the school board**; it contains three variables related positively with the factor, having obtained a total average **3.59**, which is significantly higher than three, thus **confirming hypothesis 2**.

Hypothesis 2: In Portuguese Public Schools, teachers, as internal stakeholders, agree that the school board has an attitude of openness and democratic stance about communication.

Within the context of 53 Portuguese Public Schools, a questionnaire was applied to teachers, having obtained a total of responses of 191. Considering the entire study, it can be stated that the six hypotheses were confirmed positively.

From all that has been presented, it may be concluded that internal communication in the participant schools is an important strategic tool, which provides a closer relationship with their internal stakeholders; in the specific case of this study, teachers contribute to organisational development.

CHAPTER V - Proposal of a conceptual framework of information systems' success model of internal communication

5. Introduction

In this chapter, a proposal of a conceptual framework of an information systems' success model of internal communication is presented, based on the DeLone & McLean's (2003) Information Systems Success Model.

5.1. Initial considerations

The increasing demand of IS has led organisations to become growingly concerned with the effectiveness of such systems (Isaias & Issa, 2015), inasmuch as IS are a vital component of successful businesses and organisations (O'Brien, 2004). Furthermore, it provides increased competitiveness and flexibility to organisations (Kaur & Aggrawal, 2013) and has been the subject of much debate (Zaied, 2012).

In this research, the conceptual framework is based on the DeLone & McLean's (2003) Information Systems Success Model.

Whatever the integration of information technology in an organisation, it is a necessary prerequisite for organisations to realise the benefits of using technology (Chan & Huff, 1993; Luftman & Mclean, 2004). The information technology alone does not guarantee success or failure of the strategy set out by the organisation; the use of what the organisation does through information technology is what provides added value (Chan & Huff, 1993).

In this study, five interrelated dimensions of the DeLone & McLean's (2003) Information Systems Success Model are used for the quality of the Moodle Platform as communication tool, specifically:

- System Quality;
- Information Quality;
- Intention to Use / Use;
- User Satisfaction;
- Net Benefits.

With regard to measures resulting from the DeLone & McLean's (2003) Information Systems Success Model and other information systems that provided added measures, Tables V.1 and V.2 depict the measures of *information quality* and *systems quality*.

Table V.1 – Measures of Information Quality

Items	Supporting References
Usability	Gable, Sedera, & Chan (2008) Sedera & Gable (2004)

Source: Own elaboration.

Table V.2 – Measures of system quality

Items	Supporting References
Availability	DeLone and McLean (2003)
Response time	DeLone and McLean (2003) Molla and Licker (2001)
Reliability	DeLone and McLean (2003)
Ease of use	Lin (2007) Wang (2008)
User friendliness	Holsapple and Lee-Post (2006)
Efficiency	Gable et al. (2008)
Usefulness	McKinney, Kanghyun, and Zahedi (2002)
Knowledge	Kulkarni, Ravindran, and Freeze (2006)

Source: Own elaboration.

In this way, the higher the system quality and information quality, the more it will impact on the intended to use and user satisfaction (F. Davis, 1989; DeLone & McLean, 2003), provided by the “quality” of Moodle as communication tool.

Table V.3 depicts the measures of *intention to use*, that is, to make and keep in touch with colleagues, as well as share information and knowledge (DeLone & McLean, 2003; Wang, 2008; Wu & Wang, 2006).

Table V.3 – Measures of intent to use

Items	Supporting References
Actual use	Davis (1989)
Frequency of use	Almutairi and Subramanian (2005) Iivari (2005)
Nature of use	DeLone and McLean (2003)

Source: Own elaboration.

Table V.4 presents the measures of *user satisfaction*: At the individual level of analysis, user satisfaction refers to the feeling that the user receives during and after the interaction with information technology (DeLone & McLean, 2003; Wang, 2008; Wu & Wang, 2006).

Table V.4 – Measures of user satisfaction

Items	Supporting References
Efficiency	Almutairi and Subramanian (2005) Iivari (2005)
System satisfaction	DeLone and McLean (2003)

Source: Own elaboration.

Net benefits: The perceived benefits provided by the use of systems is synonymous with the perceived usefulness (Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003).

The net benefits are the main contributions generated through the increased use and user satisfaction when interacting with the IS (DeLone & McLean, 2003).

This explains the dimensions, items and answers given in the questionnaire and the medium used in the framework – that is based on the DeLone and McLean's (2003) Information Systems Success Model (see Table V.5).

Table V.5 – Dimension, items, designation used in framework

Dimension of DeLone and McLean (2003).	Items	Question of questionnaire	Average	Designation used in the framework
Information Quality	Usability	I use the Moodle Platform to communicate and interact with colleagues.	2.54	Communicate and interact with colleagues.
		I use the Moodle Platform to communicate and interact with management.	2.64	Communicate and interact with the management.
		I use the Moodle Platform for pedagogical work with students.	2.67	Pedagogical work with students.
		I use the Moodle Platform to communicate and interact with students.	2.72	Communicate and interact with students.
System Quality	User friendliness	The Moodle Platform has a simple interface.	3.52	Simple interface.
	Ease of use	I consider it easy to use the Moodle Platform.	3.58	Easy to use.
	Reliability	The Moodle Platform is a useful communication vehicle.	3.64	Useful communication vehicle.
	Knowledge	The Moodle Platform allows managing and building organisational knowledge.	3.55	Managing and building organisational knowledge.
	Efficiency	The Moodle Platform can improve internal communication among colleagues.	3.29	Improve internal communication among colleagues.
	Efficiency	The Moodle Platform can improve internal communication with the management.	3.14	Improve internal communication with the management.
	Data	I use the Moodle Platform to consult information (regulations, schedules, minutes, etc.) of the school.	3.24	Consult information (regulations, schedules, minutes, etc.) of the school.

Source: Own elaboration.

The **Information Quality** dimension is composed of four questions related to the usability of the Moodle Platform and has a total average of 2.64, which means a response by teachers between 2 and 3; in the questionnaire, it is between, respectively, *I disagree* and *I neither agree nor disagree*.

Then we calculated the average of the four questions of the **Information Quality** dimension, by the type of answers given by teachers in the questionnaire (see Table V.6 and Graph V.I).

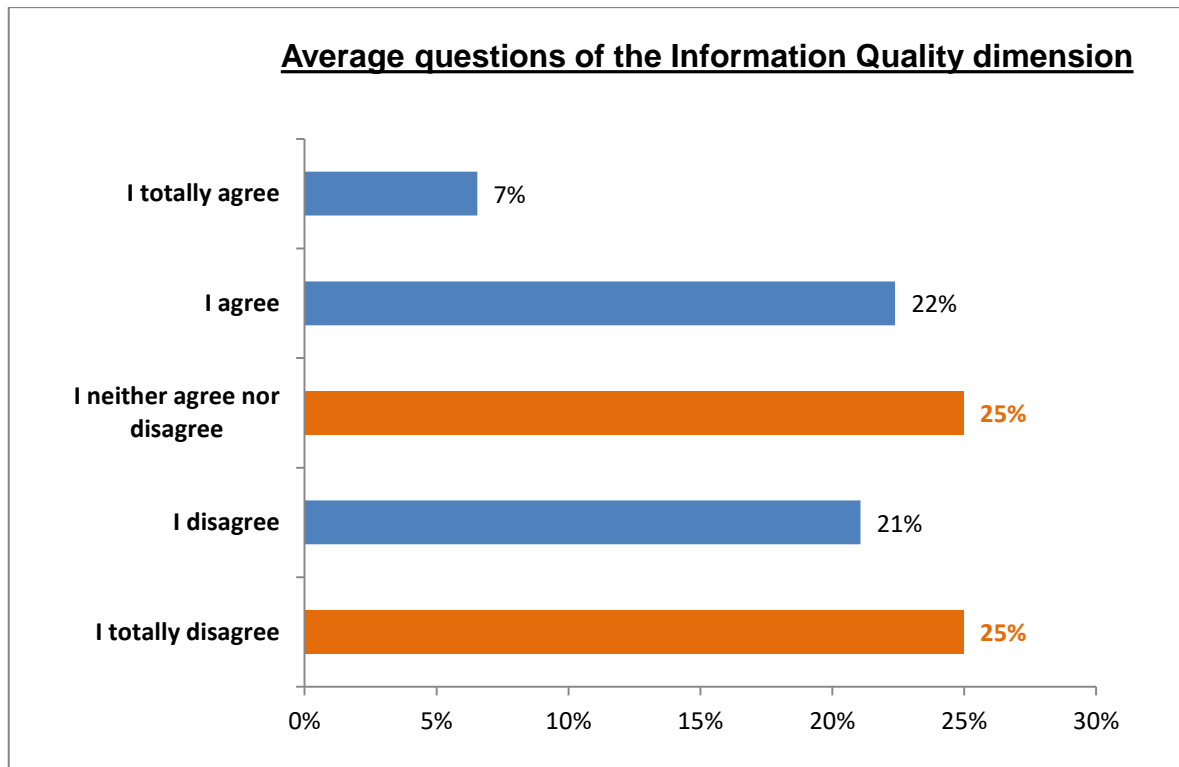
Table V.6 – Average of questions of the Information Quality dimension

		I totally disagree	I disagree	I neither agree nor disagree	I agree	I totally agree
		1	2	3	4	5
I use the Moodle Platform to communicate and interact with colleagues.	N	54	40	47	39	11
	%	28.27%	20.94%	24.61%	20.42%	5.76%
I use the Moodle Platform to communicate and interact with the management.	N	44	41	52	47	7
	%	23.04%	21.47%	27.23%	24.61%	3.66%
I use the Moodle Platform for pedagogical work with students.	N	47	43	43	42	16
	%	24.61%	22.51%	22.51%	21.99%	8.38%
I use the Moodle Platform to communicate and interact with students.	N	46	37	49	43	16
	%	24.08%	19.37%	25.65%	22.51%	8.38%

AVERAGE	47.75	40.25	47.75	42.75	12.5
%	25%	21%	25%	22%	7%

Source: Own elaboration.

Graph V.I – Average of questions of the Information Quality dimension



Source: Own elaboration.

The above table and graph allow observing that the answers given by teachers with respect to the Moodle's usability are mostly *I totally disagree* and *I neither agree nor disagree*, with 25% each.

In this study, from what has been explained and shown, it can be said that **Intention to use** indicates that teachers **do not actively use** the Moodle Platform, indicating a negative aspect.

The **System Quality** dimension is composed of seven questions related to the usability of the Moodle Platform and has total average of 3.42, which means a response by teachers between 3 and 4; in the questionnaire, it is between, respectively, *I agree* and *I neither agree nor disagree*.

Then we calculated the average of the seven questions of the **System Quality** dimension, by the type of answers given by teachers in the questionnaire (see Table V.7 and Graph V.II).

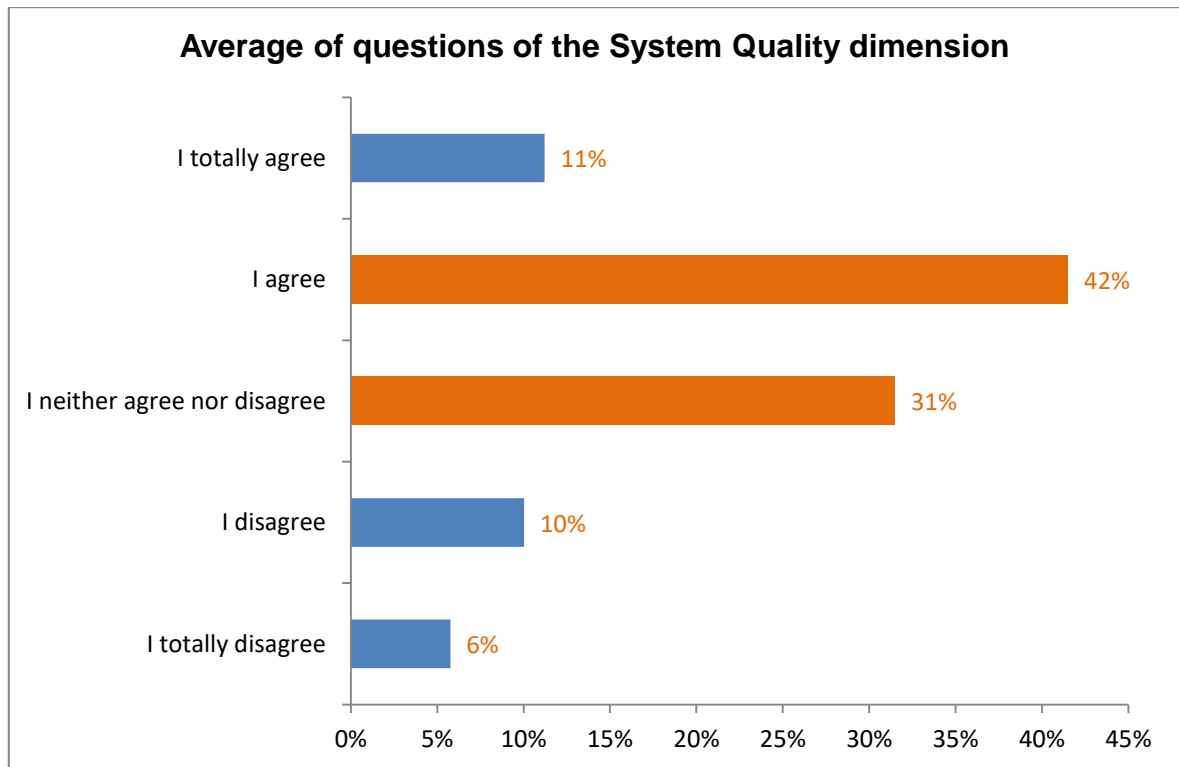
Table V.7 – Average of questions of the System Quality dimension

		I totally disagree	I disagree	I neither agree nor disagree	I agree	I totally agree
		1	2	3	4	5
The Moodle Platform has a simple interface.	N	3	23	51	99	15
	%	1.57%	12.04%	26.70%	51.83%	7.85%
I consider it is easy to use the Moodle Platform.	N	9	17	48	88	29
	%	4.71%	8.90%	25.13%	46.07%	15.18%
The Moodle Platform is a useful communication vehicle.	N	2	17	55	90	27
	%	1.05%	8.90%	28.80%	47.12%	14.14%
The Moodle Platform allows managing and building organisational knowledge.	N	7	11	68	79	26
	%	3.66%	5.76%	35.60%	41.36%	13.61%
The Moodle Platform can improve internal communication among colleagues.	N	12	21	72	72	14
	%	6.28%	10.99%	37.70%	37.70%	7.33%
The Moodle Platform can improve internal communication with the management.	N	18	20	83	57	13
	%	9.42%	10.47%	43.46%	29.84%	6.81%
I use the Moodle Platform to consult information (regulations, schedules, minutes, etc.) of the school	N	26	25	44	70	26
	%	13.61%	13.09%	23.04%	36.65%	13.61%

AVERAGE	11.00	19.14	60.14	79.29	21.43
%	6%	10%	31%	42%	11%

Source: Own elaboration.

Graph V.II – Average of questions of the System Quality dimension



Source: Own elaboration.

The above table and graph allow observing that the answers given by teachers with respect to the Moodle Platform as a communication tool are mostly *I agree* and *I neither agree nor disagree*, with 42% and 31%, respectively.

5.2. The dimensions of internal communication with teachers as internal stakeholders in Portuguese Public Schools

For all that has been accomplished throughout this study, the **general question** can be answered:

What are the dimensions that an information systems' success model of internal communication must have to communicate with teachers, as internal stakeholders, in Portuguese Public Schools?

The dimensions that an information systems' success model of internal communication should have to communicate with teachers, as internal stakeholders, in Portuguese Public Schools, based on Delone and Mclean (2003), can be seen in the framework, which is shown in FRAMEWORK – Figure V.1 – Model of internal communication based on the Delone and Mclean's (2003) model, with teachers as internal stakeholder, in Portuguese Public Schools (See page 112).

Explanation of the dimensions

In terms of Quality of the Moodle Platform as communication vehicle, it has the following dimensions:

The dimension **Information Quality** included the following aspects:

- Communicate and interact with colleagues;
- Communicate and interact with the management;
- Pedagogical work with students;
- Communicate and interact with students.

The dimension **System Quality** included the following aspects:

- Simple interface;
- Easy to use;
- Useful communication vehicle;
- Managing and building organisational knowledge;
- Improve internal communication among colleagues;
- Improve internal communication with the management;
- Consult information (regulations, schedules, minutes, etc.) of the school.

The dimension **Information Quality** is directly associated to the **intention to use**.

The dimension **System Quality** is directly associated to the **User Satisfaction**.

In this study, from what has been explained, the **User Satisfaction (teachers)** indicates that the use of the Moodle Platform as communication tool shows **satisfaction of efficiency and usefully tool**.

With regard to **Net Benefits**, this research identified that the Moodle Platform is a **useful tool**, and **others factors** were also added to the net benefits, which were also studied:

- The role of internal communication;
- The openness and democratic stance of the school board;
- Good organisation of communication vehicles;
- Levels of satisfaction about school knowledge.

However, there is a negative aspect that is the **Intention to use** by teachers, who **do not actively use the Moodle Platform**.

The **Net Benefits** studied will allow to improve internal communication with teachers and, consequently, allows building organisational knowledge.

The framework includes the **research hypotheses** (which were confirmed in section 4.3.1.4 – Hypothesis test), which are present in the net benefits:

- **The role of internal communication:**

Hypothesis 1: In Portuguese Public Schools, teachers, as internal stakeholders, agree that the role of internal communication will positively influence their degree of involvement and participation.

- **The openness and democratic stance of the school board:**

Hypothesis 2: In Portuguese Public Schools, the teachers, as internal stakeholders, agree that the school board has an attitude of openness and democratic stance about communication.

- **Good organisation of communication vehicles:**

Hypothesis 3: In Portuguese Public Schools, the teachers, as internal stakeholders, agree that there is a good organisation of communication vehicles.

- **Levels of satisfaction about school knowledge:**

Hypothesis 4: In Portuguese Public Schools, the levels of satisfaction of teachers, as internal stakeholders, increase as the levels of communication and circulation of information also increases.

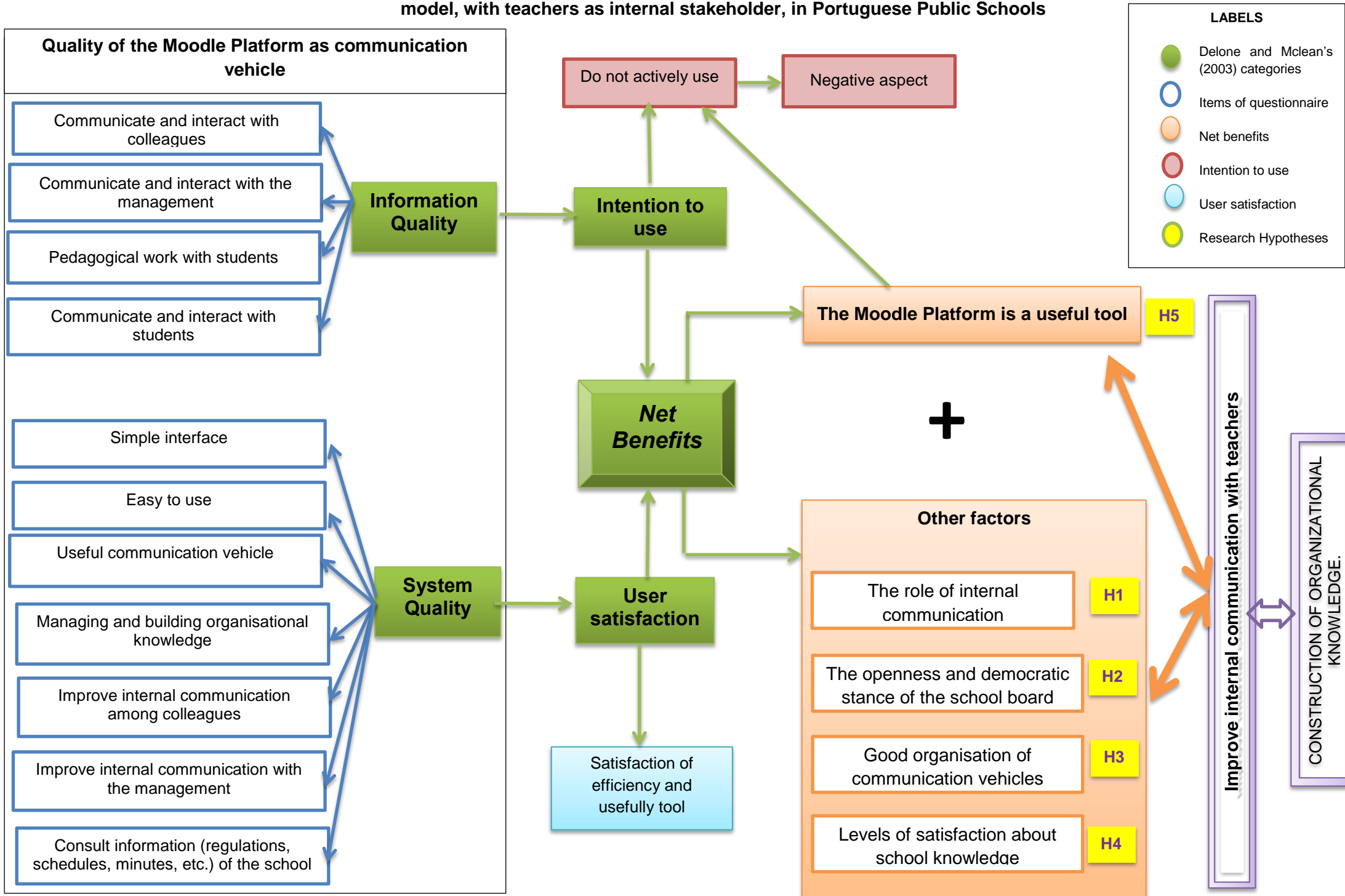
- **The Moodle Platform is a useful tool:**

Hypothesis 5: In Portuguese Public Schools, using the Moodle Platform as a communication tool influences positively the communication with teachers, as internal stakeholders.

Figure V.I shows a proposal of a conceptual framework of information systems' success model of internal communication based on the Delone and Mclean's (2003) model, with teachers as internal stakeholders, in Portuguese Public Schools.

5.3. Model of internal communication with teachers, as internal stakeholders, in Portuguese Public Schools

Figure V.1 – Model of internal communication based on the Delone and Mclean's (2003) model, with teachers as internal stakeholder, in Portuguese Public Schools



CHAPTER VI - CONCLUSIONS

On the basis of the study presented in the previous chapters, this chapter will put forward, firstly, the main conclusions. Subsequently, the contributions of the study, its limitations and the suggestions for future research are presented.

6.1. Discussion and Conclusions

In this study it was demonstrated that internal communication is an essential factor for the smooth functioning of organisations and a competitive advantage. Participation and involvement of internal stakeholders is crucial for the future of any organisation. Communication within the organisation should always pursue knowledge creation and management of relevant information, aiming at the development of each stakeholder's tasks.

Moreover, internal stakeholders of a school spend most of their day in school, and, therefore, the workplace should be as pleasant as possible. Thus, internal communication should contribute to the integration of its stakeholders, and the school should provide a harmonious environment.

Consequently, the Moodle Platform allows a better internal communication, which is an area that can influence the performance of the school organisation. As mentioned by Rodríguez, Vázquez, and Rodríguez (2006), communicative processes performed within the organisational system are internal communication, directed towards achieving stability in the organisation, in order to attain its goals, creating and maintaining culture (values and beliefs) of the organisation.

Thus, this study allowed the verification that internal communication is an essential factor for the good functioning of Portuguese Public Schools and a competitive advantage. The involvement and participation of teachers, as internal stakeholders, is a key issue for the future of Portuguese Public Schools. Equally important is the definition of a policy to promote cooperation and motivation of the relationship between their internal stakeholders' communications.

Theoretically, communication within the organisation should always aim at the creation and transmission of knowledge relevant to the development of tasks attached to each internal stakeholder's information. Thus, also in educational organisations, communication is an "instrument" that allows stakeholders remaining active in their environment.

In Portuguese Public Schools, internal communication should enable stakeholders to become involved in ideas, suggestions, opinions and any other forms of communication and transmission of information in the organisation's environment, through a dialogue process, email, meetings and any other means existing for communication within the organisation.

This research presented a study within the scope of internal communication with teachers, as internal stakeholders, in Portuguese Public Schools. The techniques used for data collection were document analysis, structured interviews and a structured questionnaire.

The document analysis allowed to know which the existing communication vehicles in schools are: in-person meetings, placards, Moodle Platform, e-mail, school website and school Facebook.

The structured interviews allowed collecting rich information and gathering testimonies and interpretations from teachers on their perspective of how internal communication is done.

With regard to the questionnaire, it was applied in the months of February, March and April, 2017 to the teachers of 53 Portuguese Public Schools; the number of valid responses was 191.

In part two of the questionnaire the use and efficiency of communication vehicles was studied, and the following conclusions were reached:

- The most used communication vehicles by teachers are e-mail and in-person meetings, followed by placards, the Moodle Platform and the school website. The school Facebook is the least used communication vehicle;
- For teachers, the most efficient communication vehicles are e-mail, in-person meetings and placards. More or less efficient vehicles are the

Moodle Platform and the school Website. The school Facebook is the least efficient communication vehicle.

In part 3 of questionnaire Factor Analysis was used; 27 questions were reduced to six determinant dimensions, which lead to the conclusion that the use of the technique deemed suitable for this purpose was successful. The six identified dimensions were: Moodle Platform as communication vehicle, Active use of the Moodle Platform, Communication vehicles, Role of internal communication, Levels of satisfaction, and Democratisation and opening of the school board.

This study proposed one general question and five specific questions:

- The general question is related to the dimensions that an IS success model of internal communication should have to communicate with teachers, as internal stakeholders, in Portuguese Public Schools.

The proposed model was based on the Delone and Mclean's (2003) model and, in terms of Quality of the Moodle Platform as communication vehicle, it has the following dimensions: Information Quality (associated to the Intention to Use) and System Quality (associated to the User Satisfaction).

In the context of Net Benefits, the following were identified:

- The Moodle Platform is a useful tool;
- The following areas: the role of internal communication, the openness and democratic stance of the school board, good organisation of communication vehicles and levels of satisfaction about school knowledge.

The Net Benefits studied will allow to improve internal communication with teachers and, consequently, will permit building organisational knowledge.

The framework includes the research hypotheses (confirmed in section 4.3.1.4 – Hypothesis test) that are present in the net benefits.

However, the model reveals that the teachers do not actively use the Moodle Platform, which is a negative aspect.

- The five specific questions, related to teachers, encompassed the following areas: Role of internal communication, Communication vehicles, Levels of satisfaction, Democratisation and opening of the school board and the Moodle Platform as communication vehicle.

All five specific questions are answered according to the validation of the hypotheses, which means that the areas of communication studied in this work are important for Portuguese Public Schools.

Therefore, the teachers express that the areas studied in this research that have more importance, based on the average, are: Levels of satisfaction (average of 4.05), Role of internal communication (average of 4.00), Communication vehicles (average of 3.57), Democratisation and opening of the school board (average of 3.59) and the Moodle Platform as communication vehicle (average of 3.42).

This study also allowed verifying that, although the teachers agree that the Moodle Platform is a communication tool that positively influences communication, they do not actively use the Moodle Platform (average of 2.64).

This research allowed concluding that, in educational organisations, internal communication is an “instrument” that allows them remaining active in their environment. In Portuguese Public Schools, internal communication should enable stakeholders, in the case of these study, the teachers, become involved in ideas, suggestions, opinions and any other forms of communication and transmission of information in the organisation’s environment, through a dialogue process, email, meetings and any other existing means for communication within the organisation.

From all that has been presented in this study, it can be affirmed that internal communication is directly related to the “global performance” of Portuguese Public Schools and should play a crucial role in the environment and in the lives of these organisations. Without the utilisation of internal communication, organisations, in the case of this study, Portuguese Public Schools, could hardly delineate strategic plans for achieving their objectives and work from a holistic perspective. Internal communication plays a major role in the internal organisational dynamics and

contributes to a better interaction and a more profitable performance of internal stakeholders.

In summary, it is through internal communication that an organisation receives, offers, channels information and builds knowledge, taking more assertive decisions in conjunction with its internal stakeholders and making them interact on the mission and objectives of the organisation.

6.2. Contribution of the study

The contribution of this study is twofold:

- In today's world, information systems are extremely important to all Portuguese Public Schools because they help them organise in an efficient and safer way.

School IS have changed school management in the areas of leadership, decision making, workload, human resource management, communication, responsibility and planning (Gurr, 2000). The management of IS helps the manager determining the aims of the school, making long term plans, distributing resources, and defining educational methods of the future, determining performances of teachers and the success of the school (Telem, 1991; Telem & Buvitski, 1995).

This study aimed to add knowledge through the application of the DeLone and McLean's (2003) Information System Success Model, which contributes to understand the communication with teachers, as internal stakeholders, in Portuguese Public Schools.

The IS that was presented in this study will allow schools to have access to all the data essential to their operation, in the scope of communication with teachers, as internal stakeholders, in Portuguese Public Schools, obtaining information about all the data that they need to know, while maintaining greater agility and organisation at reduced costs. However, to be well managed, a IS has to be updated, eliminating anomalies that may exist.

In sum, the IS presented in this study, for Portuguese Public Schools, is directly linked to the valorisation of information and knowledge, providing solutions and satisfaction in the development of the school's activities.

- Furthermore, the school has great importance in the lives of all citizens, since this is the fundamental basis in building a society based on information, knowledge and learning. Hence, the educational sector has great importance in society, namely:
 - It is the cornerstone in building a society based on information, knowledge and learning. Education is understood as the act of educating, guiding, accompanying, but also of bringing the potential of the individual from within. It is the task of education to transmit and exercise, with students, the rights and duties for the complete mastery of citizenship.
 - Another issue is the approximation of social classes, because most public schools receive students from all walks of life, which will allow the reduction of discriminatory behaviours, creating true solidarity among all, coming from knowledge, contact and mutual understanding. Social tolerance is born of rapprochement.

A good "management" of these public schools will increase the number of students coming from disadvantaged social classes, which will allow a daily life with more social justice, thus contributing to the fulfilment of students' social rights, especially those who have fewer access possibilities and fewer opportunities.

- Yet another important aspect is the human work that is developed, in particular by teachers and auxiliary staff, which makes it possible to value the co-responsibility of citizens, that is, to instil in students the notion of citizenship and social responsibility. Through partnership actions, citizens learn to think and act together, identifying what each one does best and joining efforts towards common interest objectives.

The fact that schools provide students with well-being leads them to hope for a better quality of life.

- One of the important economic factors is the ability of schools to employ people, since unemployment is the source of many current social problems and is a real “headache” for governments, given the difficulty in answering this question. Another issue to take into account is the fact that there are professional courses in schools that improve the chances of employability.

In practice, studying school as an organisation, like any other organisation, has gained increasing importance, allowing a better understanding of the school institution as a pedagogical, organisational and management unit (Barroso, 2005). Therefore, this study seeks to contribute with a new model for the understanding of school as an organisation, namely in what concerns IS and their importance for internal communication with teachers, as internal stakeholders, in Portuguese Public Schools.

6.3. Limitations of the study

This research has some limitations, namely:

- In terms of national literature, it was verified that there is a lack of studies on the topic of internal communication in Portuguese Public Schools, in order to be able to be acquainted with and to compare experiences in this area.
- It was also verified that there are no studies of Portuguese Public Schools about IS success models of internal communication.
- Taking into account that the questionnaires were applied in several schools at the same time and did not have a question that would allow to identify the region where the school was located, it is not possible to verify if there are significant differences in the teachers’ responses by regions of Portugal.

- Considering that, in Portugal, the total number of teachers (Pre-School Education, Elementary Education, 2nd and 3rd Cycle and Secondary Education) in public education is 122,452³ and the total responses in the questionnaire obtained in this study was 191, this is a limitation of the study, inasmuch that it translates a rate of 0.2% of the total population.

6.4. Suggestions for future research

The study of IS, the DeLone and McLean's (2003) model, internal organisational communication, the Moodle Platform and Portuguese Public Schools are topics that offer mixed opportunities for future research, namely:

- Develop a research study about the IS model of internal communication to all internal stakeholders (teachers, operational assistants – educational assistants –, technical assistants – administrative assistants – and students) in Portuguese Public Schools.
- In Portuguese Private Schools, develop a research study about the IS model of internal communication to teachers or all internal stakeholders and, subsequently, make a comparison of the results obtained in Portuguese Public Schools, that is, in the present study.
- Develop a study about the IS model of internal communication to teachers or all internal stakeholders in schools from other countries of the European Union and in other countries from other continents and, subsequently, distinguish their differences and similarities with Portuguese Public Schools.
Develop a study about the IS model of internal and external communication to all stakeholders in Portuguese Public Schools or in any other educational organisation.

³ Source: PORDATA (2017a).

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Appendices

Appendix A – Questionnaire applied in Portuguese

Venho por este meio pedir a sua colaboração para responder a um questionário que tem como objetivo auxiliar um estudo de investigação a ser realizado na Universidade Aberta no âmbito do doutoramento em Educação, sobre a comunicação interna com os professores nas Escolas Públicas Portuguesas.

O questionário demora cerca de 6 minutos a responder e todos os dados serão tratados anonimamente.

Muito obrigado pela sua colaboração.

PARTE I – QUESTIONÁRIO SOCIODEMOGRÁFICO E PROFISSIONAL

Sexo:

- Feminino
- Masculino

Idade: _____

Selecione o código do seu grupo de recrutamento:

- 100 - Educação Pré-escolar
- 110 - 1º Ciclo do ensino básico
- 200 - Português e Estudos Sociais/História
- 210 - Português e Francês
- 220 - Português e Inglês
- 230 - Matemática e Ciências da Natureza
- 240 - Educação Visual e Tecnológica

- 250 - Educação Musical
- 260 - Educação Física
- 290 - Educação Moral e Religiosa Católica
- 300 - Português
- 310 - Latim e Grego
- 320 - Francês
- 330 - Inglês
- 340 - Alemão
- 350 - Espanhol
- 400 - História
- 410 - Filosofia
- 420 - Geografia
- 430 - Economia e Contabilidade
- 500 - Matemática
- 510 - Física e Química
- 520 - Biologia e Geologia
- 530 - Educação Tecnológica
- 540 - Eletrotécnica
- 550 - Informática
- 560 - Ciências Agropecuárias
- 600 - Artes Visuais
- 610 - Música
- 620 - Educação Física
- 910 - Educação Especial 1
- 920 - Educação Especial 2
- 930 - Educação Especial 3

- 999 - Técnicas Especiais
- Outro

Indique os anos de serviço:

- Menos de 5 anos
- Entre 5 e 10 anos
- Entre 10 e 15 anos
- Entre 15 e 25 anos
- Mais de 25 anos

Habilitações académicas:

- Bacharelato
- Licenciatura
- Licenciatura com especialização
- Pós-graduação
- Mestrado
- Doutoramento

Situação profissional em que se encontra colocado:

- Docente com lugar em quadro da escola
- Docente do quadro de zona pedagógica
- Docente contratado
- Outro

PARTE II – Utilização e eficiência dos veículos de comunicação

1. Usando uma escala em que 1 corresponde a “Nunca” e 5 corresponde a “Sempre”, com que frequência utiliza os seguintes meios/veículos de comunicação na sua escola?

	Nunca	Raramente	Às vezes	Frequentemente	Sempre
Reuniões presenciais					
Placards					
Plataforma Moodle.					
Correio eletrónico (e-mail)					
Site da Escola					
Facebook da Escola					

2. Usando uma escala em que 1 corresponde a “Nada eficiente” e 5 corresponde a “Muito eficiente”, como classifica os seguintes meios/veículos de comunicação na sua escola?

	Nada eficiente	Pouco eficiente	Mais ou menos eficiente	Eficiente	Muito eficiente
Reuniões presenciais					
Placards					
Plataforma Moodle					
Correio eletrónico (e-mail)					
Website da Escola					
Facebook da Escola					

PARTE III – Comunicação interna

Usando uma escala em que 1 corresponde a “Discordo totalmente” e 5 corresponde a “Concordo Totalmente”, como classifica as seguintes afirmações?

1. Acho que o meu grau de envolvimento e participação na minha escola aumenta se a comunicação interna for adequada.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

2. Acho que uma comunicação interna adequada é um fator decisivo para o meu envolvimento e participação na minha escola.

- Discordo totalmente
- Discordo pouco
- Não concordo nem Discordo
- Concordo
- Concordo totalmente

3. Acho que o meu grau de envolvimento e participação no projeto educativo da minha escola aumenta se a comunicação interna for apropriada.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

4. Penso que uma comunicação interna apropriada permite aderir melhor aos objetivos da minha escola, num projeto comum envolvendo todos.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

5. Na minha escola a circulação de informação (diretrizes, normas e regulamentos) é facilitadora da comunicação entre pessoas de níveis hierárquicos diferentes.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

6. Na minha escola a circulação de informação (directrizes, normas e regulamentos) entre as pessoas de níveis hierárquicos diferentes é essencialmente burocrática.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

7. Na minha escola sinto-me à vontade para dar opiniões diferentes das da direção da escola.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

8. Na minha escola é fácil comunicar com a direção.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

9. Na minha escola, de forma geral, as minhas sugestões são aceites pela direção.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

10. Os meios de comunicação na minha escola são adequados.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

11. Os meios de comunicação disponíveis na minha escola são suficientes.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

12. Na minha escola os meios de comunicação disponíveis são eficientes.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

13. Sinto que na minha escola se usam apropriadamente os veículos de comunicação.

- Discordo Totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

14. Sinto que na minha escola existe uma comunicação interna adequada.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

15. O meu nível de satisfação aumenta quando estou informado(a) sobre os assuntos mais relevantes da minha escola.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

16. O meu nível de satisfação aumenta quando estou informado(a) sobre a maioria dos assuntos da minha escola.

- Discordo totalmente
- Discordo Pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

17. Na minha escola quando há falta de comunicação tenho um sentimento de insatisfação.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

18. Na minha escola uma comunicação adequada faz com que os meus níveis de satisfação aumentem.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

Plataforma Moodle

19. Considero fácil usar a plataforma Moodle.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

20. A plataforma Moodle tem um interface simples.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

21. A plataforma Moodle é um veículo de comunicação útil.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

22. Uso a plataforma Moodle para consultar informação (regulamentos, horários, atas, etc.) da escola.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

23. Uso a plataforma Moodle para comunicar e interagir com os alunos.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

24. Uso a plataforma Moodle para trabalho pedagógico com os alunos.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

25. Uso a plataforma Moodle para comunicar e interagir com a direção.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

26. Uso a plataforma Moodle para comunicar e interagir com os colegas.

- Discordo totalmente
- Discordo Pouco
- Não concordo Nem discordo
- Concordo
- Concordo Totalmente

27. A plataforma Moodle pode melhorar a comunicação interna com a direção.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

28. A plataforma Moodle pode melhorar a comunicação interna entre os colegas.

- Discordo totalmente.
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

29. A plataforma Moodle permite gerir e construir conhecimento organizacional.

- Discordo totalmente
- Discordo pouco
- Não concordo nem discordo
- Concordo
- Concordo totalmente

Outros comentários caso considere necessário:

Appendix B – English version of the questionnaire

I hereby ask for your cooperation to respond to a questionnaire that aims to help a research study to be conducted at the Open University in the doctoral programme in Education, on the topic of internal communication with teachers in Portuguese Public Schools.

The questionnaire takes about 6 minutes to respond and all data will be treated anonymously.

Thank you for your cooperation.

Part I - Socio-demographic and professional questionnaire

Gender

- Female
- Male

Age: _____

Select the code for your recruitment group:

- 100 - Pre-school education
- 110 - 1st Cycle of Basic Education
- 200 - Portuguese and Social Studies / History
- 210 - Portuguese and French
- 220 - Portuguese and English
- 230 - Mathematics and Natural Sciences
- 240 - Visual and Technological Education
- 250 - Music Education
- 260 - Physical Education
- 290 - Catholic Moral and Religious Education

- 300 - English
- 310 - Latin and Greek
- 320 - French
- 330 - English
- 340 - German
- 350 - Spanish
- 400 - History
- 410 - Philosophy
- 420 - Geography
- 430 - Economics and Accounting
- 500 - Mathematics
- 510 - Physics and Chemistry
- 520 - Biology and Geology
- 530 - Technological Education
- 540 - Electrical Engineering
- 550 - Computers
- 560 - Agro-livestock science
- 600 - Visual Arts
- 610 - Music
- 620 - Physical Education
- 910 - Special Education 1
- 920 - Special Education 2
- 930 - Special Education 3
- 999 - Special Techniques
- Other

Indicate years of service:

- Less than 5 years
- Between 5 and 10 years
- Between 10 and 15 years
- Between 15 and 25 years
- More than 25 years

Education:

- Bachelor's Degree
- Graduation
- Graduating with specialisation
- Postgraduate studies
- Master's Degree
- PhD Degree

Professional situation:

- Teacher with place in the school board
- Teacher of the pedagogical zone
- Contracted teacher
- Other

Part II – Use and efficiency of communication vehicles

1. Using a scale where 1 corresponds to “Never” and 5 corresponds to “Always”, how often you use the following media / communication vehicles in your school?

	Never	Rarely	Sometimes	Often	Always
In-person meetings					
Placards					
Moodle platform					
Email					
School website					
School Facebook					

2. Using a scale where 1 corresponds to “Not efficient at all” and 5 corresponds to “Very efficient”, how do you classify the following media / communication vehicles in your school?

	Not efficient at all	Poorly efficient	More or less efficient	Efficient	Very efficient
In-person meetings					
Placards					
Moodle platform					
Email					
School website					
School Facebook					

Part III – Internal Communication

Using a scale where 1 corresponds to “I totally disagree” and 5 corresponds to “I totally agree”, how do you classify the following statements?

1. I think that my degree of involvement and participation in my school increases if the internal communication is adequate.
 - I totally disagree
 - I disagree
 - I neither agree nor disagree
 - I agree
 - I totally agree

2. I think that adequate internal communication is a decisive factor for my involvement and participation in my school.
 - I totally disagree
 - I disagree
 - I neither agree nor disagree
 - I agree
 - I totally agree

3. I think my degree of involvement and participation in my school’s educational project increases if internal communication is appropriate.
 - I totally disagree
 - I disagree
 - I neither agree nor disagree
 - I agree
 - I totally agree

4. I think that proper internal communication allows me better adhere to the objectives of my school, in a common project involving all.
- I totally disagree
 - I disagree
 - I neither agree nor disagree
 - I agree
 - I totally agree
5. In my school, the circulation of information (guidelines, norms and regulations) facilitates the communication between people from different hierarchical levels.
- I totally disagree
 - I disagree
 - I neither agree nor disagree
 - I agree
 - I totally agree
6. In my school the circulation of information (guidelines, rules and regulations) among people from different hierarchical levels is essentially bureaucratic.
- I totally disagree
 - I disagree
 - I neither agree nor disagree
 - I agree
 - I totally agree

-
7. In my school I feel free to give opinions different from those of the school board.
- I totally disagree
 - I disagree
 - I neither agree ,or disagree
 - I agree
 - I totally agree
8. In my school it is easy to talk to the school board.
- I totally disagree
 - I disagree
 - I neither agree nor disagree
 - I agree
 - I totally agree
9. In my school, in general, my suggestions are accepted by the school board.
- I totally disagree
 - I disagree
 - I neither agree nor disagree
 - I agree
 - I totally agree
10. The communication vehicles in my school are appropriate.
- I totally disagree
 - I disagree
 - I neither agree nor disagree
 - I agree
 - I totally agree
-

11. The communication vehicles available in my school are sufficient.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree

12. In my school the available communication vehicles are efficient.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree

13. I feel that in my school the communication vehicles are used appropriately.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree

14. I feel that there is adequate internal communication in my school.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree

15. My level of satisfaction increases when I am informed about the most relevant subjects of my school.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree

16. My level of satisfaction increases when I am informed about most of the subjects in my school.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree

17. In my school when there is a lack of communication I have a feeling of dissatisfaction.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree

18. In my school a proper communication makes my levels of satisfaction increase.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree

Moodle Platform

19. I consider that it is easy to use the Moodle Platform.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree

20. The Moodle Platform has a simple interface.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree

21. The Moodle Platform is a useful communication vehicle.

- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree

-
- I totally agree
22. I use the Moodle Platform to consult information (regulations, schedules, minutes, etc.) of the school.
- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree
23. I use the Moodle platform to communicate and interact with students.
- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree
24. I use the Moodle platform for pedagogical work with students.
- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree
- I totally agree
25. I use the Moodle platform to communicate and interact with the school board.
- I totally disagree
- I disagree
- I neither agree nor disagree
- I agree

I totally agree

26. I use the Moodle platform to communicate and interact with colleagues.

I totally disagree

I disagree

I neither agree nor disagree

I agree

I totally agree

27. The Moodle platform can improve internal communication with the management.

I totally disagree

I disagree

I neither agree nor disagree

I agree

I totally agree

28. The Moodle platform can improve internal communication between colleagues.

I totally disagree

I disagree

I neither agree nor disagree

I agree

I totally agree

29. The Moodle platform allows managing and building organisational knowledge.

I totally disagree

I disagree

I neither agree nor disagree

I agree

I totally agree

Other comments if you consider it necessary:

Appendix C – Factor analysis with 29 questions

This appendix presents the KMO and the Bartlett's Test, Total Variance Explained and Rotated Component Matrix with the 29 questions.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.758
Bartlett's Test of Sphericity	Approx. Chi-Square
	4082.500
	df
	406
	Sig.
	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.945	23.949	23.949	6.945	23.949	23.949	4.386	15.126	15.126
2	4.848	16.716	40.665	4.848	16.716	40.665	3.819	13.169	28.295
3	3.204	11.047	51.712	3.204	11.047	51.712	3.161	10.899	39.193
4	1.766	6.090	57.802	1.766	6.090	57.802	2.821	9.729	48.923
5	1.661	5.728	63.530	1.661	5.728	63.530	2.781	9.590	58.513
6	1.403	4.836	68.366	1.403	4.836	68.366	2.480	8.550	67.063
7	1.115	3.844	72.210	1.115	3.844	72.210	1.338	4.615	71.678
8	1.063	3.665	75.874	1.063	3.665	75.874	1.217	4.196	75.874
9	.812	2.800	78.674						
10	.733	2.526	81.200						
11	.626	2.158	83.358						
12	.582	2.006	85.364						
13	.537	1.851	87.215						
14	.475	1.639	88.854						
15	.453	1.561	90.415						
16	.376	1.295	91.710						
17	.356	1.228	92.938						
18	.343	1.181	94.119						
19	.266	.918	95.037						
20	.264	.911	95.948						
21	.223	.768	96.716						
22	.204	.704	97.420						
23	.178	.615	98.035						
24	.141	.485	98.519						
25	.134	.463	98.982						
26	.103	.355	99.337						
27	.087	.300	99.637						
28	.080	.277	99.913						
29	.025	.087	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix^a

	Component							
	1	2	3	4	5	6	7	8
The Moodle platform has a simple interface.	.894	.111	.019	.117	.003	.041	.098	.159
I consider that it is easy to use the Moodle Platform.	.870	.217	.032	.053	.029	.017	.113	.123
The Moodle platform is a useful communication vehicle.	.837	.290	-.101	.004	.005	.034	.124	-.080
The Moodle platform allows managing and building organisational knowledge.	.789	.250	-.044	-.010	.078	-.052	-.205	-.139
The Moodle platform can improve internal communication among colleagues.	.635	.400	-.009	.097	-.039	.074	-.409	-.160
The Moodle platform can improve internal communication with the management.	.592	.520	.081	.030	-.116	.074	-.289	-.175
I use the Moodle Platform to consult information (regulations, schedules, minutes, etc.) of the school.	.564	.532	.147	.077	-.092	-.029	.107	-.130
I use the Moodle Platform to communicate and interact with colleagues.	.161	.876	.118	.084	.003	.066	-.093	-.002
I use the Moodle Platform to communicate and interact with the school board.	.266	.849	.081	.062	.001	.026	.032	-.203
I use the Moodle platform for pedagogical work with students.	.340	.821	-.069	-.121	.007	.069	.122	.130
I use the Moodle platform to communicate and interact with students.	.377	.786	-.008	-.099	.007	.076	.127	.077
The communication vehicles available in my school are sufficient.	.043	.048	.862	.136	-.007	.075	-.021	.041
In my school the available communication vehicles are efficient.	-.034	.020	.853	.029	-.002	.187	-.095	.008
I feel that there is adequate internal communication in my school.	-.012	-.031	.703	-.018	.096	.371	.067	-.066
I feel that in my school the communication vehicles are used appropriately.	-.054	.105	.663	.013	.080	-.019	.272	-.295
The communication vehicles in my school are appropriate.	.057	.082	.657	-.102	.197	.104	.447	-.032
I think my degree of involvement and participation in my school's educational project increases if internal communication is appropriate.	.136	.006	.012	.824	.298	.095	.062	.044
I think that proper internal communication allows me better adhere to the objectives of my school, in a common project involving all.	.073	-.007	.046	.808	.307	.118	.069	.166
I think that adequate internal communication is a decisive factor for my involvement and participation in my school.	.101	.115	.125	.794	.031	-.065	.008	.007
I think that my degree of involvement and participation in my school increases if the internal communication is adequate.	-.087	-.114	-.075	.717	.125	.190	.003	-.059
My level of satisfaction increases when I am informed about most of the subjects in my school.	.032	-.031	.103	.179	.829	.055	.147	-.115
My level of satisfaction increases when I am informed about the most relevant subjects of my school.	.023	-.085	-.023	.247	.817	-.077	.117	-.164
In my school a proper communication makes my levels of satisfaction increase.	.002	.014	.150	.246	.774	.139	.024	.045
In my school when there is a lack of communication I have a feeling of dissatisfaction.	-.084	.082	.004	.033	.715	.179	-.417	.159
In my school it is easy to talk to the school board.	-.068	.019	.161	.109	.044	.863	.054	-.145
In my school I feel free to give opinions different from those of the school board.	.101	.036	.183	.127	.061	.852	-.031	-.092
In my school, in general, my suggestions are accepted by the school board.	.057	.167	.197	.060	.124	.782	.135	.210
In my school the circulation of information (guidelines, rules and regulations) among people from different hierarchical levels is essentially bureaucratic.	.020	.148	.283	.220	.051	.214	.652	-.074
In my school I feel free to give opinions different from those of the school board.	-.048	-.062	-.149	.106	-.092	-.070	-.049	.860

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalisation.^a

a. Rotation converged in 7 iterations.

Appendix D – Interview script

Subject:

- Study of internal communication with teachers, as internal stakeholders, in Portuguese Public Schools.

General objective:

- Collect / detect the opinion / conception/perception of teachers, as internal stakeholders, on how internal communication is done in Portuguese Public Schools.

Table 0.1 - Interview guide to teachers

Block I	Objectives	<ul style="list-style-type: none"> - Legitimate the interview. - Motivate the interviewee.
	Commentaries	<ul style="list-style-type: none"> - Inform about the research purposes of this work. - Emphasise the importance of the interviewee's collaboration in achieving the objectives of this work. - Ensure the confidentiality of the use of the collected information. - Duration – 20 minutes. - Respond to all questions of the interviewee.
Block II	Objectives	<ul style="list-style-type: none"> - Identify adequacy and efficiency of communication vehicles.
	Topics/ questions	<ul style="list-style-type: none"> - Is there a good organisation of communication vehicles? - Are the communication vehicles enough? - Are the communication vehicles efficient?
Block III	Objectives	<ul style="list-style-type: none"> - Identify the importance and role of internal communication.
	Topics/ questions	<ul style="list-style-type: none"> - What is the role of internal communication? - Why is internal communication important?

Block IV	Objectives	- Identify how communication is made between people from different hierarchical levels namely school board
	Topics/ questions	- Is it easy to communicate with the school board? - Do you feel free to give opinions different from those of the school board? - How internal communication is made between people of different hierarchical levels?
Block V	Objectives	- Know the importance of internal communication for levels of satisfaction.
	Topics/ questions	- How do you feel when you know the main subjects of the school? - How do you feel when there is a lack of communication?
Block VI	Objectives	- Other comments.
	Topics/ questions	- The aim is to let teachers add other comments about internal communication that they consider important.