

Education Applications & Developments VII



Editor: Mafalda Carmo

Advances in Education and Educational Trends

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Edited by: Mafalda Carmo



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CONTENTS

Foreword	vii
Contributors	xix
Section 1: Teachers and Students	
Chapter 1 Mathematics Education and Performance, through the Prism of PISA, in Greece and Portugal <i>Eleni Nolka, & Chryssa Sofianopoulou</i>	3
Chapter 2 Social Validity of Special Education Intervention Programs: A Step towards Self-Determination? <i>Pagona Leonidou, & Lefkothea Kartasidou</i>	13
Chapter 3 Assessment of Pupils' Social Relationships and Leisure Activities in Two Romanian High Schools <i>Adriana Albu, Mihaela Vlada, Adina Iustina Nechita, & Florin Dima</i>	25
Chapter 4 Forensic Sciences as Educational Support for the Promotion of Teaching and Learning of Secondary Students <i>Shirlene Carmo, Luís Souto, & Carlos Silva</i>	36
Chapter 5 University College Students' Perspectives and Opinions on Digital Lectures <i>Marcin Fojcik, Martyna K. Fojcik, Lars Kyte, Bjarte Pollen, & Jan Ove Rogde Mjånes</i>	47
Chapter 6 Enlarging the View. A Model to Promote Quality in ECEC Services by Integrating the Indicator Framework Approach to the Situational Perspective of Children's Learning <i>Paolo Sorzio, & Caterina Bembich</i>	63
Chapter 7 Social Identity Formation of Black Learners in South African Historically White Schools <i>Anthony Mpsi, & Gregory Alexander</i>	74

Section 2: Teaching and Learning

Chapter 8	
Learning Non-Euclidean Geometries: Impact Evaluation on Italian High-School Students Regarding the Geometric Thinking According to the Van Hiele Theory	87
<i>Alessandra Cardinali, & Riccardo Piergallini</i>	
Chapter 9	
Factors Influencing the Physical Sciences Pre-Service Teacher's Pedagogical Orientations in one of the Universities in South Africa	99
<i>Aviwe Sondlo, & Umesh Ramnarain</i>	
Chapter 10	
4th IR – The Impact the Use of Mobile Teaching Devices will have on Higher Education	111
<i>Johannes Andreas Gerhardus Beukes</i>	
Chapter 11	
A View of Secondary Technical School Students on the Support and Barriers to their Professional Growth	127
<i>Dana Vicherková, & Josef Malach</i>	
Chapter 12	
Analysing Lesson-Based Interviews with Pre-Service Generalist Teachers who Lead Class Singing	144
<i>Annamaria Savona</i>	
Chapter 13	
The Development, Piloting and Administration of an Instrument to Measure Nature of Science Understanding	157
<i>Tarisai Chanetsa, & Umesh Ramnarain</i>	
Chapter 14	
Performance of Brazilian Middle and High School Students in Reading Processes: Comparative Study between Public and Private Education	168
<i>Adriana Marques de Oliveira, Jair Lício Ferreira Santos, & Simone Aparecida Capellini</i>	

Section 3: Projects and Trends

Chapter 15	
Global Intercultural Project Experience (GIPE): A distributed interdisciplinary project-based learning framework	187
<i>Manfred Meyer, Attlee M. Gamundani, Katja Becker, Daniel Malpartida, Agung Nugroho, José Ochoa-Luna, Colin Stanley, & Heike Winschiers-Theophilus</i>	
Chapter 16	
Exploring the Experiences of TVET College Educators Regarding Virtual Learning During COVID-19 in South Africa	206
<i>Adebunmi Yetunde Aina, & Ayodele Ogegbo</i>	
Chapter 17	
Understanding the Concept of Energy in High School: The Use of a Robotic System and Video Analysis as Teaching Resources	217
<i>Galeno José de Sena, Leonardo Mesquita, Marco Aurélio Alvarenga Monteiro, Janio Itiro Akamatsu, & Maria Teresa Jacob</i>	
Chapter 18	
Working with Digital Escape Rooms: Adding Value to the Teaching of Literature	231
<i>Madalina Armie, José Francisco Fernández, & Verónica Membrive</i>	
Chapter 19	
A Qualitative Case Study on the Self-Reliance Education Process of the Divorced Migrant Women in South Korea	241
<i>Sooan Choi, & Youngsoon Kim</i>	
Chapter 20	
Training Programs Based on Reflective Strategies in the Context of MDVI	251
<i>Andrea Hathazi, & Ioana-Letitia Serban</i>	
Chapter 21	
Impact of Identity-Oriented Literature Education on Adolescents' Learning Practices and Learning Outcome	262
<i>Peter Grandits</i>	

Section 4: Organizational Issues

Chapter 22	
PJI Principles: Taking Steps to have Conversations on Equity in our Classrooms and Daily Lives	275
<i>Jennifer Sanguiliano Lonski, Laurinda Louise Lott, & Hank Van Putten</i>	
Chapter 23	
Education and Leadership as Drivers for Economic Growth - The case of Portugal	287
<i>Natália Teixeira, Ana Lúcia Luís, & Paula Lopes</i>	
Chapter 24	
The Perception of Employees in the Construction of University Brand: Spanish Context Case Study	299
<i>Javier Casanoves-Boix, Ana Cruz-García, & Inés Küster-Boluda</i>	
Chapter 25	
Women in Engineering: Actions for Improving their Integration in the Faculty of Engineering in Bilbao	311
<i>Francisco Javier Maseda Rego, Itziar Martija López, Patxi Alkorta Egiguren, Izaskun Garrido Hernández, & Aitor J. Garrido Hernández</i>	
Author Index	325

FOREWORD

inScience Press is delighted to publish this book entitled *Education Applications & Developments VII* as part of the Advances in Education and Educational Trends books series. These series comprise the work of authors' and editors' to address global research in the Education area.

In this seventh volume, a dedicated set of authors explore the Education field, contributing to the frontlines of knowledge. Success depends on the participation of those who wish to find creative solutions and believe their potential to change the world, altogether to increase public engagement and cooperation from communities. Part of our mission is to serve society with these initiatives and promote knowledge, therefore it requires the reinforcement of research efforts, education and science and cooperation between the most diverse studies and backgrounds.

The contents of this 7th edition bring us to the most broadening issues in contemporary research on Education. This book explores four major areas within the broad spectrum of Education, corresponding to four sections: “Teachers and Students”, “Teachers and Learning”, “Projects and Trends” and “Organizational Issues”. Each section comprises chapters that have emerged from extended and peer reviewed selected papers, originally published last year in the proceedings of the International Conference on Education and New Developments (END) conference series (<http://end-educationconference.org/>). This meeting occurs annually always with successful outcomes. Original papers have been selected and the authors were invited to extend and to submit them to a new evaluation's process. Afterwards the authors of the accepted chapters were requested to make the necessary corrections and improve the final submitted chapters. This process has resulted in the final publication of 25 high quality chapters organized into 4 sections. The following sections' and chapters' abstracts provide some information on this book's contents.

Section 1, entitled “Teachers and Students”, provides studies within educational programs and pedagogy for both teachers and students.

Chapter 1: *Mathematics Education and Performance, through the Prism of PISA, in Greece and Portugal*; by Eleni Nolka, & Chryssa Sofianopoulou. Greece and Portugal are two Southern European countries, with nearly the same population as well as a centralized educational system, which were both deeply affected by the economic crisis during the last decade. Despite being severely hit by the economic crisis, Portugal has advanced to the OECD average level in its students' mathematical performance in the Programme for International Student Assessment (PISA 2018), while Greece has performed below the OECD average. PISA, as one of the most influential international educational surveys, aims to evaluate educational systems and provides a valuable platform for comparisons. In the first PISA 2000, Portuguese students outperformed their Greek counterparts by only

7 points and went on to widen the difference by 41 points in PISA 2018. What national strategies have been set up and implemented in Portugal so as to foster student's mathematical literacy competencies? The main aim of this study is, through a recording of the Greek and Portuguese students' mathematics achievements in PISA and at the same time of the mathematics education in both countries, through available policy documents and research reports, to comment on the current outcomes of the two educational systems and their students' performance in Mathematics.

Chapter 2: *Social Validity of Special Education Intervention Programs: A Step towards Self-Determination?*; by Pagona Leonidou, & Lefkothea Kartasidou. The conceptualization of social validity emerged in the 1970s with seminal articles by Kazdin (1977), Wolf (1978) and Van Houten (1979). Since then its importance was accepted widely and is now considered a mandatory aspect of intervention research in special education (Horner et al. 2005 as cited in Leko, 2014). Pre and post intervention measures using qualitative and quantitative methods can be used in social validity research with benefits and limitations (Schwartz & Baer, 1991). Horner et al. (2005) asserted that social validity is enhanced when an intervention is implemented with fidelity in authentic contexts by typical intervention agents, so it seems preferable for interventions to be implemented in natural environment, the classroom, by typical agents, the teachers themselves. Self-determination, then, as a means of accomplishing specific goals established by the person itself and eventually improving quality of life, is highly related to quality-of-life matters and it may also serve as a valuable associated indicator of the social importance of intervention outcomes and overall social validity (Carter, 2010).

Chapter 3: *Assessment of Pupils' Social Relationships and Leisure Activities in Two Romanian High Schools*; by Adriana Albu, Mihaela Vlada, Adina Iustina Nechita, & Florin Dima. It is necessary to assess the way students spend their free time in the final years of high school due to the poor results that have appeared recently in the baccalaureate exams. The study was carried out using a group of 202 students from two high schools in the Romanian county of Botoşani. The young people filled in a questionnaire with questions about leisure activities and social relationships. The results were processed using Pearson's chi-squared test. The time allocated daily for physical activity is mostly 15-30 minutes (23.76%). The time spent watching television programs is mostly 0.5-1 hours (35.64%). Most pupils (44.05%) do not spend free time on the computer. In the majority of cases (32.4%) pupils have „one” true friend. In their free time, they go out, mostly 2-3 evenings per week (28.71%), but there are also 31.68% negative answers. Parents are less concerned about school activity (“never” answers – 34.15%) and are also less concerned with the way their children spend their free time (“never” answers – 34.65%). There is a series of situations that guide us towards a modest concern for the future, both from pupils and their parents.

Chapter 4: *Forensic Sciences as Educational Support for the Promotion of Teaching and Learning of Secondary Students*; by Shirlene K. S. Carmo, Luís Souto, & Carlos Silva. The search for improvements in education systems has grown sharply, from incentives in the educational area to changes in the legislation, highlighting a more contextualized teaching, especially in the field of science. However, the dissemination of knowledge transcends the need and becomes a daily challenge in the life of educators, who need to reinvent themselves, reform themselves, and especially develop activities that make the understanding of content more relevant and meaningful. Although it is an arduous task for many students, this learning is indispensable to adequate scientific education. Thus, this research aimed to synthesize studies that have been developed on the use of forensic sciences as a pedagogical approach in the improvement of secondary education. The methodology is based on applied scientific research of a qualitative-exploratory nature. The results show experiences of the school context lived in the United States, Brazil, Singapore, and Portugal, where it is observed that students feel more motivated and involved in educational activities when integrated into the forensic context. The implementation of this theme to the school curriculum has the potential to attract attention and arouse interest in the sciences, contributing to the reduction of retention rates and school dropout and increasing the demand for scientific and technological careers.

Chapter 5: *University College Students' Perspectives and Opinions on Digital Lectures*; by Marcin Fojcik, Martyna K. Fojcik, Lars Kyte, Bjarte Pollen, & Jan Ove Rogde Mjånes. The traditional lecture, with a teacher talking and writing on a blackboard interacting with students, has in many cases been exchanged with different digital or hybrid solutions. It was evident when the whole world went into lockdown, and education at all levels needed to emergency transform learning in classrooms to learning through digital platforms. New structures had to be made, new routines, and new approaches. It was necessary to develop solutions for presenting different programs or motivating students to be active, even without a camera or microphone. In some cases, the digital lectures were synchronous, with teachers and students meeting at the same time to discuss a topic both in small and big groups. Other times, the digital courses were asynchronous to give the students more time to prepare themselves and activate their learning by giving them the responsibility to study individually. This study has investigated the student's views on what they have experienced during digital lectures. The students from different programmes were asked to answer an anonymous questionnaire of their opinion, ideas, and experiences with digital solutions. The results were categorized and analyzed to select some tools or approaches that most students found better or worse for their learning.

Chapter 6: *Enlarging the View. A Model to Promote Quality in ECEC Services by Integrating the Indicator Framework Approach to the Situational Perspective of Children's Learning*; by Paolo Sorzio, & Caterina Bembich. In this contribution it is proposed a critical framework, based on Basil Bernstein's theory, for two aims: a) criticizing some tendencies in the Indicator Frameworks for the evaluation of the quality of Early Childhood Education and Care services (ECEC), which rely mainly on measures of the structural and processual characteristics of the educational settings. However, the processual dimensions are reduced to their individual components, overlooking the complex and contingent interactions that create opportunities for learning; b) proposing a critical framework, based on Basil Bernstein's theory to analyze the different child-centered approaches to ECEC.

Chapter 7: *Social Identity Formation of Black Learners in South African Historically White Schools*; by Anthony Mpisi, & Gregory Alexander. The chapter engages with the issues influencing the social identity formation of black learners attending historically white schools (HWSs) in the Northern Cape province of South Africa. Black South Africans were treated as intellectually and racially inferior during the apartheid years. The situation was further exacerbated when black learners were admitted to HWSs. Consequently, the school that should normally contribute to developing a positive social identity formation of learners, seemingly has the opposite effect on black learners. An empirical investigation, by way of quantitative research, was employed to ascertain the issues influencing the social identity formation of black learners in HWSs. The authors, however, report on the data segment of 10 selected items pertaining to social identity formation, which was one of the components of an extensive doctoral study questionnaire, which was completed by 832 black learners enrolled at 27 HWSs in the Northern Cape province. Some of the findings indicate the manifestation of negative influences, low educator expectations, the disjuncture between home and school education as having an effect on the social identity formation of black learners. This chapter proposes certain suggestions to be considered by HWSs in South Africa to possibly mitigate the identified challenges.

Section 2, entitled "Teaching and Learning", offers research about foundations in the education process itself, in various contexts, both for tutors and students.

Chapter 8: *Learning Non-Euclidean Geometries: Impact Evaluation on Italian High-School Students Regarding the Geometric Thinking According to the Van Hiele Theory*; by Alessandra Cardinali, & Riccardo Piergallini. This paper aims to explore the impact of a non-Euclidean geometry course on Italian high-school students regarding the assessment of geometric thinking. To accomplish this, we analyse the results of the van Hiele levels test. We slightly modified and translated to Italian the van Hiele test, originally designed by Usiskin, and we used it to detect possible changes of the students' levels of geometric thinking after we taught a non-Euclidean geometries course of our design. The students involved in the test (N=56) span ages 15-18 and all attend the "Liceo Scientifico" high school type. The results show that

there is a statistically significant (p -value < 0.05) improvement in the median level of understanding in geometry if we consider the so-called modified van Hiele theory. Since we observe this improvement only for classes with an entering van Hiele level of at least 3, we suggest our non-Euclidean geometry course only for these classes of students, regardless of the grade.

Chapter 9: *Factors Influencing the Physical Sciences Pre-Service Teacher's Pedagogical Orientations in one of the Universities in South Africa*; by Aviwe Sondlo, & Umesh Ramnarain. To effectively teach sciences, science teachers require content knowledge of the science subject and know how to teach such content better. The purpose of this paper was to determine factors influencing the Physical Science pre-service teachers' pedagogical orientations. Orientations refer to teachers' knowledge and beliefs about teaching science at a particular grade level. Pedagogical orientations are classified into two approaches: direct approaches and inquiry approaches. A mixed-method approach was adopted, where a quantitative method was used to determine Physical Science pre-service teachers' pedagogical orientations and a qualitative method was used to establish factors influencing their pedagogical orientations. A questionnaire of ten items was administered to forty-five final year Physical Sciences pre-service teachers, and they were requested to select the most appropriate pedagogical orientation and then justify their choices. The questionnaire justifications and interviews were used to generate themes. This study's findings indicate that Physical Sciences pre-service teachers' preferred pedagogical orientations were between Direct Active and Guided Inquiry, and factors influencing their pedagogical orientations were: school resources, class size and teaching time.

Chapter 10: *4th IR – The Impact the Use of Mobile Teaching Devices will have on Higher Education*; by Johannes Andreas Gerhardus Beukes. Students and lecturers use mobile devices more and more and within a few years they will become indispensable tools in the classroom. Recent research clearly indicates that mobile devices such as smartphones, laptops and tablets are the tools of choice for students, scholars, teachers, and lecturers. It is playing a major role in teaching and learning, especially in higher education. It is therefore indisputable that the development of artificial intelligence and new ways of communication take their place in the classroom during the 4th IR. The integration of these new technologies into the teaching and learning experience in the classroom will be dependent on effective pedagogical implementation and planning to be successful. Taking this into account, this paper explores the effect that mobile devices have in the classroom on the teaching and learning experience of the student as viewed from the student's perspective. The advantages of the implementation of mobile devices must be weighed against the negative influence they may have. All the participants in the study reported that they have access to and use mobile devices to use the internet to source information.

Chapter 11: *A View of Secondary Technical School Students on the Support and Barriers to their Professional Growth*; by Dana Vicherková, & Josef Malach. The aim of the paper is to find out how Czech secondary technical schools students evaluate their professional growth in the course of their secondary school studies, what are the barriers to this growth and what are their views on the possibilities of schools to support their interest in the chosen field of study. Qualitatively oriented research focuses on the quality of secondary school studies as regarded by secondary technical schools students in the Moravian-Silesian Region of the Czech Republic. The research outputs provide suggestions for students to improve their professional growth throughout their secondary school studies and suggestions for procedures that may help remove barriers in their educational paths to a technically oriented profession. Respondents - secondary technical schools students - most frequently state the possibilities of their professional growth, comprising the "I-student" and "Teacher and teaching" factors. More than half of the barriers mentioned by students belong to the category of dispositional (personality) barriers. In second place are institutional barriers, and a negligible number of barriers have been included among situational barriers. The most significant number of students' opinions on how the school should deepen their interest in the field was concentrated in the group of factors "I - student". It is followed by opportunities to support interest in the "School" factor group.

Chapter 12: *Analysing Lesson-Based Interviews with Pre-Service Generalist Teachers who Lead Class Singing*; by Annamaria Savona. In pre-school and primary schools, teaching songs and leading class singing are often entrusted to generalist teachers. During their training, they are expected to attain and/or consolidate subject-specific skills. Research has yet to explore how generalist teachers make sense of their song-leading lessons and become familiar with subject-specific knowledge and skills. Using interviews based on video-recorded lessons from 10 pre-service generalist teachers, this study examines how each teacher experienced and managed leading class singing in their three-year training. The analysis includes the use of the visual tool Lesson Activities Map (LAMap), which is a graphical system for the organisation of lesson activities and is valuable for ensuring consistency in the interpretation of lesson-based interview analysis. This chapter presents a case study and offers implications both for the dissemination of new visual analytical methodologies in education and for understanding the teaching experiences of generalists involved in the professional development of teaching songs and leading class singing.

Chapter 13: *The Development, Piloting and Administration of an Instrument to Measure Nature of Science Understanding*; by Tarisai Chanetsa, & Umesh Ramnarain. The study describes the development of an instrument to measure the Nature of Science (NOS) understandings in high school Science teachers. The instrument was initially piloted on two high school teachers in South Africa, one teaching Life Sciences and the other Physical Sciences. It was subsequently used to measure NOS understanding in 10 high school Science teachers in South Africa over 6 months in 2021. The objective of the study was to construct a questionnaire that could measure NOS understanding based on the Family Resemblance Approach (FRA) and the Consensus View (CV). The NOS is a construct that has been defined by various scholars and there exist multiple perspectives. For this study, two perspectives that define NOS, the CV of Abd-El-Khalick and the Reconceptualised Family Resemblance (RFN) approach to NOS of Erduran and Dagher were considered. To collect data on NOS understanding, the researcher compared the Views of Nature of Science (VNOS) instrument used to capture NOS understanding under the CV, and the RFN questionnaire used to capture NOS understanding under FRA and compiled an Integrated Family Views of Nature of Science (IFVNOS) questionnaire. The findings revealed that the IFVNOS questionnaire developed can be used as a reliable tool to measure NOS understanding.

Chapter 14: *Performance of Brazilian Middle and High School Students in Reading Processes: Comparative Study between Public and Private Education*; by Adriana Marques de Oliveira, Jair Lício Ferreira Santos, & Simone Aparecida Capellini. This chapter discuss the following question: Is there a difference in the assessment for reading processes between students in public or private middle and high school? To answer these questions, this chapter aims to compare the performance of middle and high school students of public and private schools schools using tests from the Brazilian Adaptation of Reading Processes Assessment Battery - PROLEC-SE-R. The Reading Processes Assessment Battery - PROLEC-SE-R, individual version, was applied to 436 students: 221 from public school and 215 from private school, in the following order: 1) Reading Words, 2) Reading Pseudowords, 3) Grammatical Structures II, 4) Punctuation Marks, 5) Reading Comprehension I, 6) Reading Comprehension II, e 7) Oral Comprehension. A cross-sectional study was performed using descriptive and bivariate analysis. Based on these results, the answer to the initial question is affirmative. Private school students do indeed achieve a higher mean score when compared to public school students in word reading, showing that spelling helps in the reading processes. When knowledge of the use of the word in a sentence, extraction of meaning and its understanding is required, the difficulty of accessing the mental lexicon of the population studied becomes evident.

Section 3, entitled “Projects and Trends”, presents chapters concerning, as the title indicates, education viewed as the center for innovation, technology and projects, concerning new learning and teaching models.

Chapter 15: *Global Intercultural Project Experience (GIPE): A distributed interdisciplinary project-based learning framework*; by Manfred Meyer, Attlee M. Gamundani, Katja Becker, Daniel Malpartida, Agung Nugroho, José Ochoa-Luna, Colin Stanley, & Heike Winschiers-Theophilus. This chapter describes a new concept and experiences of a distributed interdisciplinary learning program for students across continents. The aim is to provide students with a truly Global Intercultural Project Experience (GIPE) by working together with peers from around the world and solving real-life client’s problems. We have received seed-funding for four annual projects to engage students from Germany (Europe), Namibia (Africa), Indonesia (Asia), and Peru (South America). In 2020 and 2021, 28 and 44 students from four continents engaged in a one-semester distributed interdisciplinary project for a Namibian and Indonesian client, respectively. Despite Covid-19 they successfully completed the project expressing deep appreciation for the learning opportunities overcoming challenges of working across widespread time zones, cultures, changing requirements, and various technical difficulties. Considering the vast learning benefits, we suggest incorporating such projects in all tertiary education curricula across the globe, while streamlining organizational efforts based on lessons learned.

Chapter 16: *Exploring the Experiences of TVET College Educators Regarding Virtual Learning During COVID-19 in South Africa*; by Adebunmi Yetunde Aina, & Ayodele Ogegbo. This study explored the experiences of private TVET college educators regarding virtual learning during the Covi-19 school lockdown. The Kanter theory of change is adopted as the theoretical base in this study. Data collection was done through face-to-face semi structured interviews and non-participant observation with six educators from three TVET colleges in Gauteng Province, South Africa. Collected data was analyzed using content analysis. Findings reveal that though participants have positive attitude toward the process of change required in transitioning from traditional environment to virtual environment, majority of them did not receive substantive training on how to use technology to support virtual teaching. However, educators indicated that the change process comes with several challenges such as technical problems, ineffective communication from management, workload, inadequate training, lack of access to ICT tools and lack of other structural support within the college which impacts their effective implementation of virtual teaching. Thus, teachers should be adequately prepared, supported and empowered to cope with the changes and transition processes involved to continue teaching in a virtual environment. More so, TVET college managers and policy makers should priorities change management programmes designed to prepare teachers for the inevitability of technological change in education.

Chapter 17: *Understanding the Concept of Energy in High School: The Use of a Robotic System and Video Analysis as Teaching Resources*; by Galeno José de Sena, Leonardo Mesquita, Marco Aurélio Alvarenga Monteiro, Janio Itiro Akamatsu, & Maria Teresa Jacob. This article presents a work carried out to improve students' understanding of the concept of energy using a robotic platform and video analysis software. The electronic system made it possible to monitor a movement with characteristics similar to those of a simple harmonic motion, through a looping device, allowing the demonstration of the law of conservation of energy. The monitoring of the experimental configuration was carried out using the Arduino® platform. Demonstrations involving the use of the apparatus as well as the video analysis software were made for Physics students from a high school. The results showed that the automation of a simple experiment can become an interesting tool for both the teaching and learning process, triggering social interactions among students useful to assist in the fixation of physical concepts, even the most abstract ones such as Energy. In addition, the use of video analysis software provides students with experiences of collecting data, analyzing graphs and tables, which supplements the understanding of the nature of science and scientific practice.

Chapter 18: *Working with Digital Escape Rooms: Adding Value to the Teaching of Literature*; by Madalina Armie, José Francisco Fernández, & Verónica Membrive. The escape room, also known as an escape game, is a gamification tool that aims to enhance motivation and teamwork (Wood & Reiners, 2012). In the educational field, in particular, the escape room can be defined as an action game in real time in which the players, in teams, solve a series of puzzles or problems and carry out tasks related to the curricular contents studied throughout the course, in one or more rooms, with a specific objective and at a specific time (Nicholson, 2015). The use of escape rooms for teaching-learning the English language at different educational levels has been studied qualitatively and quantitatively (Dorado Escribano, 2019; López Secanell & Ortega Torres, 2020). However, there is no study on the applicability of the escape room in the English literature classroom at the level of tertiary education. This paper aims to demonstrate how the inclusion of this innovative pedagogical tool can be useful for working on theoretical-practical contents of literary studies of the undergraduate degree in English Studies. The study will focus on exercises to implement as part of the educational digital escape room using a sample of students and evaluating their motivation.

Chapter 19: *A Qualitative Case Study on the Self-Reliance Education Process of the Divorced Migrant Women in South Korea*; by Sooan Choi, & Youngsoon Kim. The purpose of this study is to explore the point where divorced migrant women who have been given the goal of self-reliance for their new lives are reconstituted as 'Adventurers' and identify the limitations. For this objective, a case study was conducted using the life histories of 5 divorced migrant women residing in the self-reliance support facility (named Didimteo), selected among the life history interviews of 80 migrant women. We performed open coding for data analysis, repeatedly reading the participants' interview data. As a result, qualitative classification revealed three distinct meanings for the self-reliance education process: Recovery of affirmative, Rediscovery of 'becoming,' Empowerment for the

future. If the self-reliance education experience is defined in terms of the results of this study, it may be described as a ‘process of becoming an adventurer for economic self-reliance’. However, the psycho-emotional comfort and support that migrant women experience through self-reliance education at Didimteo confirmed the possibility that Didimteo could move forward as a self-reliance education community and social network for divorced migrant women.

Chapter 20: *Training Programs based on Reflective Strategies in the Context of MDVI*; by Andrea Hathazi, & Ioana-Letitia Serban. MDVI children acquire and develop communication skills based on their specific features and usually they need a large amount of time to learn how to employ different systems of communication to express a need and have an impact on other people or on the environment. In this context, a Consortium of 3 universities, 4 special schools, one NGO and one IT company have addressed the need of a professional training in communication abilities of the specialists working with MDVI children in an Erasmus+ European project called PrECIVIM. A training program has been created, based on common experiences, reflective strategies, and different components. The results of the training program are presented in terms of the data regarding the number of responses registered in the reflective logs (RL), the analysis of the professionals ‘reflections on their interventions, the number of professionals who at the end of the training program began to use the RL to record data about MDVI children’s communication skills and to acknowledge teamwork with specific feedback from the intervention sessions. The training program has emphasized the need of trainers and partners who offer constructive feedback and who implement reflective strategies in the intervention process regarding communication with MDVI children.

Chapter 21: *Impact of Identity-Oriented Literature Education on Adolescents’ Learning Practices and Learning Outcome*; by Peter Grandits. A mixed-methods quasi-experimental study evaluated the effects of a pedagogical intervention in literature education on Austrian upper secondary high school students’ insight into the self and the other. The intervention is based on the newly developed NDR-model, the letters in the abbreviation representing the basic practices of narration, dialogue and response underlying the model. Two cycles of NDR interventions on the identity issues of “happiness” and “relations” were implemented. An IPA study was conducted to explore how the implementation of the NDR-model of literature education affected participants’ learning practices (narration, dialogue, response) and learning outcomes (self-understanding and understanding of the other). Qualitative analysis of interview and artefact data suggested that NDR students’ learning practices were promoted. Additionally, they experienced insight into the self and the other because they were stimulated to engage with literary texts in the context of their personal identities.

Section 4, entitled “Organizational Issues”, gives a glance on tools for implementing organizational learning and change in the education context.

Chapter 22: *PJI Principles: Taking Steps to have Conversations on Equity in our Classrooms and Daily Lives*; by Jennifer Sanguiliano Lonski, Laurinda Louise Lott, & Hank Van Putten. Today’s educators, from kindergarten through higher education, are uniquely positioned to provide their students with real life opportunities that demonstrate and promote equity, change, and social justice ideals amongst their peers, throughout the schoolhouse and into their communities. These opportunities for students, supported by the norms and culture of the classroom, often come in the form of daily interactions with curricula, which affords teachers the window to teach how to disrupt inequity among students and in their lives. For teachers and school leaders to open this window, each must also have the courage to investigate and learn from the mirrors of the experiences of others reflected to them. The work of the Peace and Justice Institute at Valencia College provides educators with the courage to investigate those personal mirrors for the benefit of their students. Their courage is found in the sharing of stories about themselves and by turning off their automatic responses to the stories of others. The following chapter considers how The Principles, the philosophical foundation of PJI, translate into an equitable classroom practice. This qualitative case study of 24 teachers explores the impact of the PJI Teachers Academy in the k-12 classrooms of these teachers.

Chapter 23: *Education and Leadership as Drivers for Economic Growth - The case of Portugal*; by Natália Teixeira, Ana Lúcia Luís, & Paula Lopes. The competitiveness of nations requires several factors that must occur for it to attain sustained levels of economic development. Some of the most important vectors that constitute differentiators of nations competing globally are the qualification of its population, as well as the degree of sophistication, capacity for decision-making and strategic vision of its leaders and elites. A greater competitive ability of a nation translates into a higher capacity for wealth creation and a better performance on key items of social and human development. Often, small niches of excellence and strong leadership in key sectors are crucial, notably for the example that these examples of excellence signify to others, thus producing a dragging effect whereby other sectors and individuals are pulled in by inspiring role models and their examples. This chapter examines the performance of Portugal from different indexes, providing different perspectives, all related to levels of education and retention of qualified individuals, aiming to assess and evaluate the deep constraints that the country faces at a critical moment. Recommendations are centered around the key idea of a strong emphasis on the acquisition of knowledge as a catalyst for economic development.

Chapter 24: *The Perception of Employees in the Construction of University Brand: Spanish Context Case Study*; by Javier Casanoves-Boix, Ana Cruz-García, & Inés Küster-Boluda. This research was carried out to examine the role of brand capital in higher education. For this purpose, the main contributions of the literature to the study of brand capital and its application to the education sector were analyzed. Then, the variables determining brand capital in the higher education sector were identified and a comparison between the main employees was made. Once the

Foreword

educational brand capital construct was established, an empirical study was carried out using a valid sample of 1,106 responses (690 from lecturers and 416 from service staff, belonging to eight public and private universities in Valencia (Spain). SPSS v.19 for Windows and EQS 6.2 were used as statistical work tools. The present investigation fills a gap in the marketing discipline because it is considered that there are no current investigations that analyze the perception of the brand capital through the opinions of the main employees involved in Spanish universities. The results obtained show the effects of each variable of brand capital in relation to the determining variables and, especially, to brand awareness, thus, helping the university managers to decipher the key aspects for their employees and thereby generate strategies to maintain them or improve them.

Chapter 25: *Women in Engineering: Actions for Improving their Integration in the Faculty of Engineering in Bilbao*; by Francisco Javier Maseda Rego, Itziar Martija López, Patxi Alkorta Egiguren, Izaskun Garrido Hernández, & Aitor J. Garrido Hernández. The situation of women in the engineering world has different aspects that should be carefully analysed. Last century, the woman who first broke this taboo in Spain was the mayor of Bilbao, the first female industrial engineer graduated in Spain in 1929, Pilar Careaga. By means of her public presence, her message could reach general society, but only as something exceptional. At the Faculty of Engineering in Bilbao, the first female Industrial Engineer was Pilar Ipiña, who graduated in 1965. Thirty six years later. After nearly a century, women in engineering remain a clear minority. Proposing solutions requires knowing the causes, in order to be able to carry out actions that lead to harnessing women's talent and enable them to realise their full potential. This paper presents a multi-staged process for the integration of women in engineering degrees. The first stage analyses different issues about the faculty structure and regulations. The second stage relates educational objectives and the gender perspective. The third stage marks the importance of educational materials. The fourth stage summarizes educational methodologies and activities. The fifth stage proposes a change of assessment model. Finally, the sixth stage comments on the importance of control and visualization of results.

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Section 1
Teachers and Students

Chapter #6

ENLARGING THE VIEW. A MODEL TO PROMOTE QUALITY IN ECEC SERVICES BY INTEGRATING THE INDICATOR FRAMEWORK APPROACH TO THE SITUATIONAL PERSPECTIVE OF CHILDREN'S LEARNING

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ABSTRACT

In this contribution it is proposed a critical framework, based on Basil Bernstein's theory, for two aims: a) criticizing some tendencies in the Indicator Frameworks for the evaluation of the quality of Early Childhood Education and Care services (ECEC), which rely mainly on measures of the structural and processual characteristics of the educational settings. However, the processual dimensions are reduced to their individual components, overlooking the complex and contingent interactions that create opportunities for learning; b) proposing a critical framework, based on Basil Bernstein's theory to analyze the different child-centered approaches to ECEC.

Keywords: child-centeredness, quality of services, indicator frameworks, reflective practice.

1. INTRODUCTION

According to Chung and Walsh (2000), three major perspectives on child-centered practices have historically evolved: Romantic, Developmentalist and Democratic. Each identifies the child as at the center of the educational practices, characterized by the identification of each child's needs, competencies, interests. However, each perspective proposes its own declination of what the child is at the center of (Romantic: her/his world; developmentalist: the curriculum; democratic: the community).

The "Romantic" conception, elaborates the "naturalistic" idea of childhood as an age of harmony between the Child and Nature; the adult has the task of "fertilizing" the environment, to promote the development of the child's potential, which is expressed through play.

The "Developmental" perspective assumes a universalistic and sequential process of children's growth, characterized by a match between the children's ages and the expected achievements. In this perspective, greater attention is paid to lessons and structured materials, to the learning of counting, to the recognition and reproduction of written letters, numbers and geometric figures. In this conception, more sophisticated competencies such as metacognition and peer collaboration are learned after basic skills (recognition, reproduction and simple problem solving activities).

The "Democratic" perspective is characterized by the idea of the child as rich in expressive competencies, able to construct her/his own knowledge through meaningful experiences in collaboration with others. The socio-constructivist conception emerges from the interpretation of Piaget's and Bruner's theories and in particular of the practical elaboration of the Reggio Emilia approach. The central concept concerns the role of

individual interests and skills in the development of the child, supported by a stimulating environment. In this perspective, development implies greater self-regulation of thought, greater expressive mastery and motivation to explore the environment. The role of the adult consists in the design of stimulating learning settings, supporting children's initiative and thinking through appropriate discursive interventions (Bruner, 1978). In this perspective, the adult assumes new and sophisticated skills in planning, documentation and the organization of educational activities to support children's participation and self-reflection (Hendy & Whitebread, 2000).

2. CRITICISING THE QUALITY INDICATOR FRAMEWORKS METHODOLOGY

In developing a Quality Framework, Policy Institutions have usually identified some structural and processual indicators, in order to signal the level of achievement in the relevant dimensions of the educational practices, according to given benchmarks.

The focus of this contribution is to question the validity of measures of the interactional processes, as well as reflecting about the potentiality of the introduction of qualitative evidence to promote quality and child-centeredness in the Early Childhood Education and Care services.

The Quality Indicator Frameworks are supposed to be the “objective” devices to comparatively evaluate the quality of Early Years services as well as to highlight their critical elements. According to this approach, any educational practice is cut up into its constitutive elements: each component is evaluated on the basis of simple measures, typically obtained by using standardized instruments (for example: rating scales, check-lists; standardized observational schemes); then its quality assessed according to given standards.

*Table 1.
Relevant features usually incorporated in the Quality indicator frameworks.*

<i>Structural factors</i>	<i>Organizational factors</i>	<i>Process factors</i>
Finances	Staff qualifications	Staff responsiveness
Indoor/outdoor spaces	Staff/children ratios	Complexity of tasks
Playing materials and furniture	Health/food regulations	Quality of social interactions
Impact over the community	Design/documentation strategies	Children's attendance
	In-service teacher training and action-research	Relationships with families

However, there are methodological limits in the analysis of the educational processes: for example, frameworks such as CLASS (Pianta, La Paro, & Hamre, 2008) and ECERS-R (Harms, Clifford, & Cryer, 2004) are intended to single out and measure isolated dimensions as proxies of complex and dynamic processes, such as respect of children's rights, promotion of good relationships between adults and children, non-invasive care, autonomy, respect for children's interests and emotions, close listening, joint meaning making, prosocial behaviors.

Peter Moss and collaborators (Dahlberg, Moss, & Pence, 2013; Moss, 2016) introduce some epistemological criticisms toward standardized tools:

- The Quality Indicator Frameworks are based upon a philosophical conception of an absolute rationality, developed by external experts; any educational service should be measured and compared through the same criteria. However, this approach lacks cultural sensitivity: Early Childhood educational services usually act as bridges towards families and communities, in order to integrate different developmental demands and to promote children's participation in culturally meaningful activities. As a consequence, each educational institution is related to its specific community and develops its own characteristic organization (Fuller, 2007); in the Quality Indicator approach, complexity and diversity are overlooked, although these are essential components of the professional work;

- By transforming education into a technical project, the educational means are separated from their aims; the apparently neutral question of "What works?" substitutes the more relevant questions of "Working for whom?", and "Where to?";

- the standardized measures tend to separate professional agencies from the contexts in which they occur: in fact, educators deliberate in the emergent contingencies of their practical conditions, acting what is considered possible, given the contextual constraints, rather than according to an abstract rationality.

Although the systematicity and elegance of many Quality Frameworks are to be appreciated, there are two critical points:

- a) the Frameworks tend to merge the concept of "indicator" and the concept of "measure" (Alexander, 2008). Some measures of quality can be easily assessed (space per child; teacher/children ratios; health quality of food; daily schedules); however, rating scales do not suffice to evaluate the child-centeredness and the opportunities for learning, since they single-out individual dimensions from the complex and dynamic processes of interaction; since educational processes are dynamic and contingent system of interacting conditions, they are not easily captured by static measures of isolated variables. Indicators tend to be easy-to-formulate aspects of complex processes, however they lose sight of the layered nature of the constitutive components of the educational practices; as a consequence, a high degree of inference as well a high level of ambiguity can be found in applying the Quality Frameworks (Alexander, 2008).

- b) Assessment of singled-out dimensions of the educational practices creates a rift from the direct experiences of practitioners, children and families in their everyday practices (Hammersley, 1995). The contingent and variable conditions that act as "gravitational forces" (Erickson, 2006) on the participants in any educational setting are undervalued. In turn, educational deliberations emerge as perceived opportunities in the contextual contingencies. As a consequence, evaluation procedures should not isolate the participants' acts from the complexity of their educational situations.

By confounding measures and indicators, the complexity of the child-centered pedagogy is overlooked. The construct validity of the quality indicators needs to be assessed through educational theories, rather than relying only upon the management approach. Furthermore, practitioners develop their professional activities in a context characterized by specific settings, tools, norms and people that together constitute the situated conditions for

the development of the curricular activities. As a consequence, from the point of view of the practitioners, each setting is a unique context of practice. The ranking of each specific dimension on the standardized measures is only an information that must be interpreted.

2.1. Integrating the measurement approach with the insiders' accounts

The measurement approach can be considered conducted by a detached subject who applies standardized instruments to gather data (which represent the magnitude of specific dimensions in a setting), in order to compare them with given standards. This distant evaluative look can be complemented with in-depth professionals' accounts in narrative terms.

In Pastori and Pagani's research (2017), the introduction of Quality Frameworks tools in a professional practice is an opportunity to offer a pattern of information about the setting that can trigger the educators' reflection, narrative account and innovation. Pastori and Pagani (2020) subsequently conducted a participatory action-research with professionals, by introducing the tool Classroom Assessment Scoring System (CLASS - Pianta et al., 2008), with the aim of engaging the participants in a critical discussion of their practice. Participants reported some positive aspects in the use of the framework, such as the centrality of the educator-child relationship in defining the quality of the service and the focus on the emotional dimension of learning. On the other hand, there are some shortcomings: the framework lacks a deep focus on the interactional competence of children; it emphasizes productivity ("doing something"), rather than the opportunities for learning attributed to the educational activities (which are the "meaningful, rich experiences for children?", "Why do some activities become learning experiences?").

3. DEVELOPING AN ALTERNATIVE FRAMEWORK BASED ON BASIL BERNSTEIN'S WORK

Since the simple sets of distinctive features that are represented in the Quality Indicator Frameworks cannot define the complexity of historically evolved practices, we propose an alternative framework, based on the concepts introduced by Basil Bernstein (1973; 1999), to understand the practical organization of the child-centered perspective, in terms of the curriculum, the interactional patterns and the levels of cognitive engagement in the Early Years settings. This approach may complement the more established model of standard measures to evaluate the quality of ECEC services.

According to Bernstein, the practices of schooling can be identified by intersecting three dimensions:

a) Classification: the degree of insulation an element has in relation to others, for example: experiences in-school and out-of-school; the degree of separation of activities in the same educational practice. The higher the classification, the stronger is the instructional approach;

b) Framing: the degree of adult's control of the interaction; the higher the control of discourse by the adults is, the stronger is the teacher's voice; the higher the opportunities of children's contribution, the more the children's voices are valued;

c) Vertical and horizontal discourse is a dimension that can highlight some differences within the child-centered approach. The socio-constructivist approach, such as the Reggio Approach promotes a vertical discourse, since it is based not only on child-initiated activities, but also on higher order thinking strategies, such as planning, revision, communication.

Democratic and constructivist approaches in early childhood education are characterized by children's interests and inquiries, exploratory talk, in which the adults accept and extend the children's thoughts and contributions. Democratic approaches to child centered education give value to a variety of children's contributions through different sign systems (should they be verbal language, visual, dance, musical, etc) to make children become the authors of their own individual contribution to the conversation. In these contexts, the professionals adopt practices based on the principles of "children as active constructors of knowledge. In classrooms consistent with this theory, teachers provide direction and guidance as they assist children in developing their knowledge, but they also provide opportunities for children to direct their own explorations of objects and academic topics" (Stipek, 2004, p. 550). Characteristically, settings are integrated and children can move freely, in order to overcome differences in gender, abilities, ethnicity and to some extent in age. Each organized space can create the opportunity for children's initiative, rather than fragmenting the curriculum in simple and repetitive exercises (Low classification). Interactions tend to promote children's genuine contributions to joint activities, to emphasize democratic dialogue, reflection and metacognition, rather than imposing an instructional script (Low framing). Romantic and constructivist Child-centeredness tend to diverge in the role of adults: in the constructivist approach, such as in the Reggio Emilia experience, the teachers' questions are oriented to extend the children's thinking processes, in order to achieve more clarity and systematicity during the joint curricular activities (Vertical discourse). In the Romantic perspective, adults let the children play according to their personal feelings and interests. As a consequence, the documentation tends to be a static representation of memorable events and situations, rather than an opportunity to highlight some crucial elements of the children's participation and learning; practices tend to be fragmented into different centers of interest.

Table 2.
Different educational approaches according to Bernstein's theory.

Educational approach:	Instructional	Romantic Child-centeredness	Constructivist
<i>Classification</i>	<i>Strong</i>	<i>Weak</i>	<i>Weak</i>
Principles	Focus on the acquisition of behavior. Children are not considered competent in setting up their own objectives and strategies	Variety of children's behavior is the object of development. Not a prescriptive scheme of behavior	Focus on promoting personal growth rather than on instructing children. Children are considered accountable for selecting their own projects and for self-regulation
Metaphor of learning	Learning as acquisition	Learning as exploration	Learning as construction and transformation

Goals of education	Children master procedures for external tasks. Focus on correctness	Well-being and self-regulation	Metacognitive dispositions; higher order thinking and understanding
Teaching/education	A piecemeal approach to learning. The activities relate to isolated elements of learning, repetition; memorization.	Children's conducted global activities: they set goals; select tools and strategies	Project-based learning; children set up their own goals and collaborate; teachers promote
<i>Framing</i>	<i>Strong/visible</i>	<i>Weak/invisible</i>	<i>Weak/visible</i>
	Instructional script; children's contributions should be filled in a prescriptive scheme; they are predictable; the expected answer	less directive approach; children are expected to regulate peer group relationships and individual behavior	High variety of scaffolding strategies, since the children's thinking processes are at the center of the educational practice
	The teacher models the activity and has an expected behavior in mind	The teacher supports the child-initiated activities; gives freedom and monitors behavior	The teacher: expands children's activities; promotes dialogue; privileges goal-based activities, in which some relevant aspects are highlighted in order to promote learning

By analyzing the educational settings in relation to the three critical dimensions of classification, framing and discourse, practitioners and researchers can map the position of their specific educational activities in the continuum of the three approaches of Child-centered practices, with opportunities to plot the route of their subsequent projects.

4. EXAMPLES OF APPLICATION OF THE OBSERVATIONAL SCHEME IN DIFFERENT EDUCATIONAL CONTEXTS

In order to understand the educational activities in relation to the Child-centered approach, an open observation scheme has been worked out, to situate the child in the complex system of practice, constituted by people, tools, norms of interaction, educational objectives (Adams et al., 2017)¹.

The observational device does not isolate the child from the context of her/his environment, but it offers the opportunity to analytically reconstruct the organization of the educational activity (according to Strong/weak classification), the interactional texture that emerges within specific educational events (Strong/weak framing), and the level of cognitive

¹ In the "Erasmus+ 2019-1-UK01-KA203-061665 "Child-Centred Competences for early Childhood Education and Care", the observational device was applied to identify different child-centered practices, as evidentiary basis to support an online course (Child-centred Competences for early Childhood Education and Care, 2021).

engagement, as well as the teachers' scaffolding strategies to promote children's learning (Vertical/Horizontal discourse). The goal is the recognition of the environmental conditions that affect each child's opportunities to participation and learning and the identification of the developmental paths.

As a result of the application of the observational device, the practitioners work out short narratives that represent prototypical episodes in their institutional settings. In turn, the episodes can become case studies that are characterized by all the contextual conditions that are relevant in the unfolding of an educational activity. Qualitative analysis (Erickson, 1987) may offer an evidentiary basis for:

- Recognizing the specific conditions that hinder the children's participation and learning according to the child-centered practice, especially the constraints to the recognition of children's voices, rights and agency;
- Promoting collaborative design of educational activities, in order to encourage children's exploration, dialogue and thinking processes;
- Conducting action-research projects within the services, in order to promote joint reflection among practitioner, to enhance the professional resources in the service.

The open observation scheme has been applied in different early Years educational settings, which, in turn, were analyzed according to the proposed Framework, and discussed with the practitioners, in order to reconstruct the practice and to identify opportunities to change. The different Child-centered approaches are introduced in the following examples. It is worth-noting that there is no single measure to characterize an educational event according to a given category, but the analysis highlights a system of possibilities that can evolve in specific directions.

The three examples differ in the degree in which the organization of the setting, the interactional patterns and the cognitive engagement of the activity combine together, to the establishment of the conditions for children's participation.

a. Instructional approach: learners' utterances evaluated in relation to an implicit ideal model; learners' contributions are valid only in relation to the teacher's perspective (strong classification and strong framing), as in table 3:

*Table 3.
Example of the Instructional approach.*

Time:	Episode	WHO	Reflection
The activity lasts 40 minutes	The children are now disposed 2 for each table, one in front of the other; the objective is to make a drawing of a wood; they can pick up objects from the big box to make individually a collage. They work alone, but allowed to exchange ideas, tools, help. Ilaria is making a collage by placing all the light objects of a wood near the upper margin of her large paper sheet and the other objects progressively below, according to their weight. Therefore, clouds, small leaves and small fruits are above larger leaves and fruits. Accordingly, pebbles are above stones. the teacher tells her that she should draw	16 children, 9 f; 7 m, 5 year olds. WHERE The room is the largest of the school. It is called the "Color Room" but at 12am it is transformed in the lunch room	The teacher does not accept Ilaria's interpretation of the Wood and asks her to rely upon a "naturalistic model" of representation. She asks Matteo to follow the correct procedure in his artefact.

	<p>a “real” tree “otherwise one cannot understand that it is a wood” as the teacher says, “You have already put this [indexing a piece of bark] you need small branches”.</p> <p>The teacher suggests other children to draw a line to mark the separation of the wood and the underwood. She asks Matteo “try to make visible the water flowing from the spring”.</p>		
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b. Learner-centered approach: learners’ experiences and differences are valued; multiplicity of voices. The teacher does not instruct; however, has set up the conditions for the learning situation (low classification, low framing, horizontal discourse):

*Table 4.
Example of the Learner-centered approach.*

Time:	episode (.....)	WHO	Reflection
The activity lasts 30 minutes	The children sit in a circle and sing a song in unison. 6 children are very focused on singing; 3 listen and sometimes chat together; Mario dances. A child leaves the group and plays with a puzzle, another one enters in the playhouse. The teacher calls the children’s attention towards the singing group. She eventually asks each child in the circle to indicate her/his best friend. Marta is disappointed because the girl she has indicated as her best friend does not reciprocate. Progressively, the group loses its cohesion. Arianna goes to wash her teeth’s; Lorenzo plays with an airplane. There are 11 groups or individual children playing.	<p>25 children, 12 females, 13 males. 5 years old.</p> <p>WHERE</p> <p>A large room in the pre-school/preparatory class</p>	The teacher sets up the activity and tries to involve children by catching their attention; some children shift their attention toward other activities. The group activity gradually dissolves and some children begin individual activities.

c. Constructivist approach: the teacher promotes exploration of new meanings and connects levels of thinking and arguing (Vertical discourse, low classification, low framing, encouraging multiple perspectives in conducting the activity):

Table 5.
Example of the Constructivist approach.

Time:	Episode	WHO	Reflection
The activity lasts 15 minutes	<p>The teacher asks the children to represent their daily route from home to school, by using small wooden sticks and blocks.</p> <p>The children look at the map. The route has some turns and inclinations. They recognize some elements of the landscape they went across (trees, stones, meadows, animals) and reproduce them using the objects on the table.</p> <p>A: "I shall mark the path with the small sticks</p> <p>M: "I put those high trees right here; here, I put the school because we started over there and arrived there [higher]</p> <p>Teacher: Why do you make the turn in this way?</p> <p>A: I would have made also the climb but I wasn't able to</p> <p>G: "you can make a kind of ladder"</p> <p>Teacher: "How can you made the ladder?"</p> <p>A: "Make use of the sticks, a lot underneath, fewer on the top"</p> <p>Teacher "How many do you put on the bottom and how many on the top?"</p> <p>A "I try with 3 on the bottom, then 2 and 1 on the top</p> <p>M: "we should build it on the chair, which is the hill, how can we make it stable?"</p> <p>A: "We balance them".</p>	<p>The children collaborate in small groups of 4, on a common task.</p> <p>In the observed group there are 4 children of mixed age (4 and 5 year-olds) and gender (2 males and 2 females)</p> <p>WHERE</p> <p>The setting is a multifunctional room. Previously, the children sketched a map of the route the school bus takes to bring them to the preschool. The map is projected onto a wall.</p> <p>The teacher also predisposes a construction set of small wooden sticks and other stuff.</p>	<p>During the activity the children discuss and develop strategies to represent their route to the preschool. They are collaborative and respectful of their peers' ideas.</p> <p>Some children show good metacognitive competencies and reflect on their strategies (i.e. 'if I lean the sticks on the wall, they don't fall down and I 'll be able to make the climb').</p> <p>The teacher's interventions invite children to reflect on their strategies.</p> <p>This activity promotes competences in diverse experiential fields as: language, knowledge of the world, graphical representation.</p>

In the first example (Instructional approach), the setting is organized to support the individual activity (strong framing); the teacher adopts a strong implicit prescriptive model of a "naturalistic representation" of a woodland (strong classification); as a consequence, Ilaria's abstract representation is not recognized as appropriate and she is asked to modify her artefact; Matteo is invited to add more conventional signs in his representation (vertical discourse). The children's divergent points of view are not considered acceptable and not encouraged.

In the second example (Learner-centered approach), the teacher tries to direct the children's attention toward a unified and structured activity (low classification), consisting in a common participation in a choir. However, the children tend to have a limited role in developing the activity (horizontal discourse) and soon feel disengaged; some show limited attentional clues, others start to play individually, creating 11 centers of interest (low

framing). As a result, the group is loosely connected, there is not a common center of attention, to exchange ideas and to construct new understandings.

In the third example (Constructivist approach), the teacher promotes the development of integrated competences in the children, by engaging them in a complex task (vertical discourse) consisting in a connected representation of their daily route from home to school in different formats: a collective drawing, a three-dimensional model (low classification), encouraging dialogical interactions and multiple perspectives in conducting the activity (low framing). Furthermore, the teacher's interventions are not directive, but oriented to promote the children's reflection on their cognitive strategies ("Why?", "How?").

5. CONCLUSION

The Quality Frameworks are useful tools to register a great amount of information about the magnitude of relevant dimensions of the Early Years educational settings. However, their usefulness relies in understanding their implicit rationales and as an opportunity to promote critical reflection among practitioners, as the principal agents of change and improvement of the internal quality of the setting. Through reflective documentation, practitioners can recognize the quality of their child-centered practice, by recognizing potential boundaries to the children's participation, the degree of control of the communication between adults and children, the opportunities for learning created by the curricular design, dialogic communication and meaningful experiences.

By the comparative analysis of different educational events, it is possible for researchers and practitioners to identify the particular structure of interaction, the opportunities and constraints that are offered to the children's participation and learning. In turn, this analysis allows for both a reflection on the implicit model of Child-centeredness and a progressive transformation of the educational practice.

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