"ALL HANDS-ON DECK": OCTALYSIS FRAMEWORK IN PRIMARY ENGLISH LANGUAGE LEARNING

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ABSTRACT

Supported by Chou's *Octalysis Framework* (2016) in the design of activities, this article investigates how Octalysis framework-based reading and writing activities can be conducive to foster the learning of reading and writing in English as a Foreign Language by primary education pupils in a collaborative project-based learning context.

A case study was carried out in a third-grade classroom in a Portuguese private school. The sessions, developed in face-to-face and online modes, were organized according to pupils' answers to a questionnaire – to identify their learning preferences. Qualitative data, collected through sessions' audio and video recordings, pupils' assignments, group assessments, and cloze tests became the basis of this paper. Results revealed that pupils were motivated and engaged in performing reading and writing tasks, having improved their reading and writing skills, and also promoted the development of social and cognitive soft skills.

KEY WORDS

primary english language learning; octalysis framework; EFL reading and writing; collaborative problem solving; case study.

SISYPHUS

JOURNAL OF EDUCATION

VOLUME 10, ISSUE 03,

2022, PP 225-243

DOI: https://doi.org/10.25749/sis.26985

"TODOS AO CONVÉS": O MODELO OCTALYSIS NA APRENDIZAGEM DE INGLÊS NO 1º CEB

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RESUMO

Apoiado no modelo Octalysis (2016) na conceção das atividades, este artigo analisa como as atividades de leitura e escrita podem ser conducentes a fomentar as aprendizagens da leitura e escrita em inglês língua estrangeira por alunos do 3º ano em contexto de aprendizagem colaborativa baseada em projetos na resolução de problemas.

Foi realizado um estudo de caso numa escola privada portuguesa. As sessões, presenciais e on-line, foram organizadas de acordo com as respostas dos alunos a um questionário, para identificar preferências na aprendizagem. Os dados qualitativos, recolhidos em gravações audiovisuais das sessões, trabalhos dos alunos, heteroavaliações e testes *Cloze* tornaram-se a base deste trabalho. Os resultados revelaram que os alunos estavam motivados e empenhados nas atividades de leitura e escrita, tendo melhorado as suas capacidades de leitura e escrita e promovido o desenvolvimento de competências sociais e cognitivas.

PALAVRAS-CHAVE

ensino de inglês no 1º CEB; modelo *Octalysis*; leitura e escrita em inglês língua estrangeira; resolução colaborativa de problemas; estudo de caso.

SISYPHUS
JOURNAL OF EDUCATION
VOLUME 10, ISSUE 03,
2022, PP 225-243

DOI: https://doi.org/10.25749/sis.26985

"Todas las Manos en la Cubierta": El Modelo de Octalysis en el Aprendizaje del Inglés en la Escuela Primaria

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RESUMEN

Apoyado en el modelo Octalysis (2016) en el diseño de actividades, este artículo analiza como las actividades de lectura y escritura pueden ser provechosas para fomentar aprendizajes de lectura y escritura en inglés, como lengua extranjera, por alumnos del 3º año en contexto de aprendizaje colaborativa basada en proyectos en la resolución de problemas en colaboración.

Fue realizado un estudio de caso en una escuela privada portuguesa. Las sesiones, presenciales y online, fueron organizadas según las respuestas de los alumnos a un cuestionario, para identificar preferencias en el aprendizaje. Los dados cualitativos, recogidos en grabaciones audiovisuales de las sesiones, trabajos de los alumnos, heteroevaluaciones y test *Cloze* se volvieron la base de este trabajo. Los resultados revelaron que los alumnos que estaban motivados y empeñados en las actividades de lectura y escritura, mejoraban sus capacidades de lectura y escritura y promovieron el desenvolvimiento de competencias sociales y cognitivas.

PALABRAS CLAVE

enseñanza del inglés en la escuela primaria; modelo *Octalysis*; lectura y escritura en inglés como lengua extranjera; resolución de problemas en contexto de colaboración; estudio de caso.

SISYPHUS
JOURNAL OF EDUCATION
VOLUME 10, ISSUE 03,
2022, PP 225-243

DOI: https://doi.org/10.25749/sis.26985

“All Hands-On Deck”: Octalysis Framework in Primary English Language Learning

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INTRODUCTION

Learning English as a foreign language (EFL) becomes imperative, since it is the first foreign language (FL) most European pupils have formal contact with at school, being engaged in reading and writing activities. It is also the dominant language of media, social networks, and the entire digital world, leading us to adopt many of its expressions in our everyday life. This worldwide proximity has made collaboration essential in workforce and education as well (Organization for Economic Co-operation and Development [OECD], 2017a). Therefore, people are driven to share understanding, knowledge, and effort to find solutions for problems that may arise in a collaborative problem-solving (CPS) way (He et al., 2017; OECD, 2017b), and EFL classes can be the ideal opportunity for its development.

However, studies’ results show that it is important to rethink EFL integration into schools’ curricula, to focus on pupils’ experiences and work as a springboard for the future ahead (Figueroa Flores, 2015). Thus, pupils are provided with tools that enable them to think and go beyond the classroom walls and encourage them to be active in their learning process, making learning meaningful and experiential (Fernández-Corbacho, 2014). Gamification seems to be one of these approaches and we highlight the Octalysis Framework (Chou, 2016), which is the most recent gamification model. We intend to know its effects on the learning of reading and writing in a CPS context in a Portuguese third grade primary English class.

This article is part of a PHD project and organised as follows: first we do an overview of teaching English language reading and writing at primary level; then, we define and present more extensively the CPS skill and the Octalysis Framework core drives (CD); afterwards, we move on to describing the study itself, in general terms, research question and objectives, participants, the description of implemented activities, ending the text with the presentation of results, data discussion and a brief conclusion.

READING AND WRITING IN AN EFL CLASSROOM

English language is a rather recent subject in Portuguese primary education, unlike most European countries. From 2005/2006 to 2014/2015, EFL was a Curriculum Enrichment Activity, focused on oral and listening skills, to make children aware of the learning of a new language and culture, supported by playful activities, instead of language schooling. However, in 2015/2016, it became part of the primary education curriculum from the third grade on. In this transition, reading and writing seems to have become as valued as other skills.

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Learning these two skills in primary education in an EFL context can be carried out in the same way and with the same methods as in mother tongue learning (Brewster, Elis, & Girard, 1992; Cameron, 2001; Pinter, 2017). Both share related learning processes and reinforce each other when carried out together. Learning reading and writing in EFL: i) enables relationships to be established with prior knowledge; ii) identifies key concepts and ideas; iii) boosts multiple interpretations; and iv) synthesises information (Nunan, 2015; Pinter, 2017). The process of the native-language-to-foreign-language transfer is seen as inevitable (Nunan, 2015; Pinter, 2017), since, as a rule, first children learn to read and write in their mother tongue, and then they scaffold the strategies they learned into the FL (Daud, Akmam, & AlSaqqaf, 2018; Pinter, 2017). However, their learning in FL is influenced by several factors, such as the time of exposure to the new language and the learners' age (Pinter, 2017), for example.

Nevertheless, it is important to state that for many young learners reading and writing in EFL is not new, especially for those who play online games, as many of these games assume communication through written messages in English, addressed to other players, as well as reading information, instructions, and clues (Pinter, 2017). The development of these two skills is based on: i) isolated words; ii) short simple sentences, with known vocabulary; and iii) short texts, also simple, on topics close to the learners' tastes and experiences, through known vocabulary (Bravo, Cravo, & Duarte, 2015; Brewster, Elis, & Girard, 1992; Cameron, 2001; Pinter, 2017). With this in mind, it is essential to draw different strategies in the classroom to develop both skills. Although there seems to be no approaches to teaching and learning to read and write in EFL that are considered more effective, it is important that their design is supported by regulatory guidelines to promote the development of both skills and to ensure their harmonization. The aim is to meet the learners' interests and preferences and their individual features, to emphasize and promote the role of the learner in the process. Pinter (2017) suggests encouraging contact with children of the same age, but from a different school or, even, a different country, by email or letter, for example. In this way, not only communication skills are boosted and developed, but also moments of contact with other reading and writing experiences are promoted, which can be more authentic and meaningful to learners. They can also resort to online search, with the teacher's guidance, to get information on the topics to write about (Pinter, 2017). In this way, they can get in touch with mobile devices as a learning tool in the classroom and extend their knowledge beyond textbooks and classroom walls. Yanti and Amti (2013) state that, despite their complex nature in learning, the integration of both skills into the class dynamics allows the design of a range of activities that are likely to cover different learning styles. These conclusions were reaffirmed by other authors who also added that the development of these two skills in the FL classroom in a play-based context of group or pair work not only encourages socialization and increases pupils' engagement, but also reduces their fear of failure (Azizi, Tkáčová, Pavliková, & Jenisová 2020; Daud, Akmam, & AlSaqqaf, 2018; Spanou & Zafiri, 2019; Yanti & Amti, 2013). This is related to the fact that they feel: i) encouraged to share knowledge and experiences with their groupmates; ii) driven to help and to accept their peers help through corrective feedback; and iii) engaged in a less formal way of learning that is more related to their experiences and enjoyment of play (Pinter, 2017).

LEARNING THROUGH COLLABORATIVE PROBLEM-SOLVING

Throughout life, we are faced and challenged by different problems, which require us to be able to solve and overcome them. Hence, problem-solving skills are developed, which is the ability of the individual to resort to strategies in search of solutions to real-life problems whose solution is not evident (OCDE, 2003). The development of this skill in a school learning context has been the focus of the OECD since 2003, strongly focusing on a range of contexts, subjects, and problems (OCDE, 2003). It presupposes participants' understanding of the problem, through its analysis, description, modelling, discussion, and reflection, to find possible solutions (OCDE, 2003; Yavuz & Atar, 2020). During this process, other skills are awakened and developed. We refer to communication, collaboration, critical thinking, and creativity (Battelle for Kids, 2019 [2]), which are considered imperative for learners for the 21st century.

With the promising technological growth and its consequent integration into the educational context, this skill assessment has become computer-based, allowing learners to contact with a wide range of problems (OCDE, 2003; Yavuz & Atar, 2020). Therefore, learners encounter simulations in a more realistic way than they could with paper-based examinations (Yavuz & Atar, 2020). This technological progress has also enabled people and contexts from different parts of the world to come together, with collaboration becoming every day's agenda (OECD, 2011). In 2015, the OECD's "Programme for International Student Assessment" (PISA) found it relevant to add collaboration, thus emerging the CPS skill (OECD, 2017b). Therefore, CPS became perceived as critical and essential in collaborative education and working contexts (Mo, 2017). Apart from being crucial, it should be crosscutting and leading to lifelong learning.

CPS is defined as the ability of an individual "to effectively engage in a process whereby two or more agents attempt to solve a problem by sharing the understanding and effort required to come to a solution and pooling their knowledge, skills and efforts to reach that solution" (OECD, 2017b, p. 32). PISA designed the CPS assessment framework (OECD, 2017a), that consists of three core competencies: i) "establishing and maintaining shared understanding"; ii) "taking appropriate action to solve the problem"; and iii) "establishing and maintaining team organization" (OECD, 2017a; Yavuz & Atar, 2020).

It is a process that aims at engagement, sharing opinions, information, knowledge, and experiences among the group members, with the purpose of promoting dialogue to get to an agreement and a solution, through respect and different opinions' acceptance (He et al., 2017; Yavuz & Atar, 2020). Therefore, social and cognitive skills are developed concomitantly (He et al., 2017). Regarding social skills, we refer to those that pupils should have to be able to work together and in harmony, such as: participation, perspective taking and collaboration skills. Cognitive skills are focused on the students' ability to understand, interpret, and solve the given problem, including the pupils' critical thinking, creativity in finding solutions outside the expected ones, and decision-making (He et al., 2017).

CPS requires learning and the school is the best place. For He et al. (2017), the most successful activities in this area are those that involve participation and sharing. This joint decision-making, provided by CPS, encourages dialogue and communication among participants, focusing not only on solving the given problem, but also on building knowledge with their peers. So, active, dynamic, and collaborative learning is developed and provided (Bell, 2010). Similarities are found with the findings of the studies supported by gamified activities in FL skills development, to the extent that this kind of activities anticipates the

[2] https://www.battelleforkids.org/networks/p21/21st-century-learning-exemplar-program

students' engagement in their performance, perceiving them as challenges similar to game levels (Figueroa Flores, 2015). We highlight Chou's Octalysis framework (2016), as it is, to our knowledge, the most recent and the widest ranging in terms of motivational dimensions (Araújo & Carvalho, 2018) and which we will explain next.

THE OCTALYSIS FRAMEWORK

According to Chou (2016), game elements drive players to make decisions to meet different challenges that go beyond entertainment, bringing them closer to real-life experiences. Emotions are aroused, and participants feel engaged in the process, facing it as something that belongs to them and as the result of their experience. This is what Chou (2016) calls *Human-Focused Design*. It is important to check these effects in the educational area, based on games mechanics, dynamics and components and applying them in activities, bearing in mind that gamification cannot be limited to points, badges, and leaderboards (Chou, 2016).

Games addictive potential is a consequence of players' motivation and engagement to complete its levels. It was in this vein that the *Octalysis Framework* (Chou, 2016) was designed. It consists of eight CDs[3], whose support enables the design of meaningful and motivating experiences and holds a set of connected motivations, regardless of the player profile. These are: *Epic Meaning & Calling* (CD1); *Development & Accomplishment* (CD2); *Empowerment of Creativity & Feedback* (CD3); *Ownership & Possession* (CD4); *Social Influence & Relatedness* (CD5); *Scarcity & Impatience* (CD6); *Unpredictability & Curiosity* (CD7) and *Loss & Avoidance* (CD8). These CDs are connected to the players themselves.

Epic Meaning & Calling arises from the sense of greatness, which comes from the students'[4] belief in feeling that they have been "chosen" to perform something that they consider transcendental, boosting their participation and involvement in its accomplishment. *Development & Accomplishment* comes from the student's interest in following their evolution and overcoming the given challenges. This CD seems to be connected to the award system and to the activity completion. *Empowerment* results from the students' creativity in finding and presenting 'out of the box' solutions to the problems. *Ownership & Possession* comes from the feeling of possession or appropriation of something. *Social Influence & Relatedness* arises when students feel motivated and influenced by their peers when solving the activities. The feeling of responsibility in ensuring the activities' completion is also considered. *Scarcity & Impatience* is the sixth CD and it emerges from students' desire to have something that is unachievable to them, leading to the awakening of feelings of frustration and/or impatience. The *Unpredictability & Curiosity* CD illustrates the students' engagement and curiosity in discovering the following activity, which has an unexpected character. Finally, the *Loss & Avoidance* CD arises when students show fear of making a mistake or failing, leading them to take measures to prevent something negative or unexpected from happening.

These Chou's *Octalysis Framework* eight CDs promote engaging, rewarding and fulfilling teaching-learning moments. Therefore, students are exposed to the playful, attractive, and engaging nature of the game elements, while they acquire new

[3] "Core drive" is a motivational impulse, that is, what drives someone to accomplish something.
[4] The author refers to 'player', but as our study focuses on the learning context, we felt it would make more sense to refer to 'students'.

knowledge and expertise. We therefore believe that gamification, more precisely Chou's model, is a strong ally in the design of student-centred lessons.

However, it is important to know how these CDs impact primary English pupils' learning of reading and writing when carried out in a collaborative problem-solving context, as there are few publications in this area. In this article, we intended to use Chou's framework in reading and writing primary English learning activities in a collaborative problem-solving context.

METHODOLOGY

This work is being developed as part of a doctoral project, whose purpose is to investigate, describe and evaluate the influence of gamified pedagogy in promoting the learning of reading and writing in the context of collaborative problem solving in the English class in primary school.

We worked with an EFL 3rd grade class of 16 pupils, with whom a set of 13 group sessions activities were implemented. They come from a Portuguese upper middle-class background and include a pupil who joined the class late November 2019 and a Polish pupil.

We will address the methodology followed in the quest for the answers to our research question (How Chou's *Octalysis Framework*-based activities can be conducive to fostering EFL learning of reading and writing by primary education pupils in a collaborative problem-solving context?), adopting a case study methodology (Yin, 2001), of a descriptive nature (Coutinho, 2014), resorting to data gathering instruments: i) sessions' audio and video recordings and their transcriptions, to gather information regarding pupils' participation and discourse whose transcription made it feasible to analyse data; ii) pupils' assignments to be able to continuously observe, follow and assess their learning of reading and writing, to design strategies to overcome eventual difficulties; iii) group assessment worksheet carried out on *Google Docs*, to access pupils' perspectives and opinions about the activities carried out in class, group dynamics and groupmates; and iv) cloze tests, with slight changes, conducted at three different moments, to analyse and assess the development of pupils' reading and writing skills. We also took the required precautions as to data protection, anonymity and obtaining of informed consent from the parents of the pupils involved. All the data collected from session's audio and video recordings and pupils' assignments were coded resorting to webQDA software, using aprioristic categories (Bardin, 2018).

This study aims to investigate how Octalysis Framework-based activities (Chou, 2016) can be conducive to foster EFL learning of reading and writing by primary education pupils in a collaborative project-based learning context, more precisely, we aim to analyse the impact of Octalysis Framework-based activities in promoting EFL: i) reading; and ii) writing.

OCTALYSIS FRAMEWORK-BASED ACTIVITIES

The following activities were designed according to i) pupils' answers to a questionnaire to know their preferences and interests, so that the activities would be more appealing to them; ii) unit three of the textbook contents (Torres, Lauder, & Shipton, 2012); iii) both

Portuguese legal documents in this teaching cycle "Metas Curriculares de Inglês Ensino Básico: 1º, 2º e 3º Ciclos [5] " (Bravo, Cravo, & Duarte, 2015) and "Aprendizagens Essenciais|Articulação com o Perfil dos Alunos[6]" (Ministério da Educação, 2018); and iv) Chou's *Octalysis Framework*. They were also grounded on a story written by the teacher and completed by pupils, during the group activities, resorting to fact finding through a web browser and using problem-solving strategies. The storyline emerged around a journey across Europe, Asia, and Africa, during which pupils were expected to get to know traditional clothing items, contact with other languages, cultures, and traditions. The design of these activities was carried out with *realia* and supported by gamified pedagogy: i) contextualised challenges with time limit; ii) immediate feedback; and iii) winning and/or losing points. Table 1 summarizes the activities carried out in the sessions.

Table 1
Sessions' design

Session	Activity	Length	CD	Assessed skills
1	Puzzle/words game Clothes game	45'	1,3,5,7	Reading and writing known words Social and cognitive skills
2	Worksheets "Joana's issue"	45'	2,3,4,5,6	Reading and writing known words Social and cognitive skills
3	Storytelling Quizz	75'	2,3,5,6	Reading short texts Reading and writing known words and short sentences Social and cognitive skills
4	Search activity "Show and tell"	45'	1,2,3,4,5	Reading and writing short texts Speaking skills Social and cognitive skills
5, 6, 7	Facts-finding search Story writing	30'	2,3,5,7	Reading and writing known words, short sentences and texts based on internet search
8	Storytelling	45'	2,3,5,7	Reading known words, short sentences and texts based on internet search
9	Quizz drawing	30'	1,3,5,7,8	Writing short sentences Speaking skills Social and cognitive skills
10	Quizz answering	30'	1,3,5,7,8	Reading short sentences Social and cognitive skills
11	Hamze's video	45'	3,5,7	Listening and understanding a short video Social and cognitive skills

[5] "Curricular Goals for English for Elementary School: 1st, 2nd and 3rd Cycles" (our translation).
[6] "Essential Learning|Connection with the Learners' Profile" (our translation).

12	Hamze's activity Stars counting	45'	1,2,3,4,5	Reading and writing known words and short texts Social and cognitive skills
13	Jordan guest	45'	2,3,5,7	Speaking skills Social and cognitive skills

Sessions' description

The first session took place 2nd March 2020 at a pre pandemic confinement time. Pupils were given wristbands with their groups' colours, keeping them until the end of the sessions. To check what pupils knew or remembered about the topic, each group received an envelope with their group symbol, where they found puzzle pieces, and some cut out letters. Pupils had to do the puzzle and label it. After teacher's feedback, groups who completed the task correctly within the allotted time, won a star, to stick on the leaderboard (this was always visible throughout the sessions). As the puzzles were different, they were described to the class in English. Then, groups played "the clothes game": the teacher mentioned clothes in English and one student from each group had to run to a pile of clothes and put on the correct one. For each correctly dressed clothing item, groups got a star. According to Chou (2016), these activities can arouse the motivational CDs *Epic Meaning & Calling*, *Empowerment of Creativity & Feedback*, *Social Influence & Relatedness* and *Unpredictability & Curiosity* in so far as joint decision-making was about discovering something unknown, leading pupils to predict the outcome.

In session 2, pupils observed and discussed four pictures to review: seasons, weather, clothes and their description and activities. Afterwards, they were introduced to Joana, a fictional eight-year-old girl, who presented her problem in the form of a story that was read out loud by pupils: Joana was going to travel around the world for a year and she didn't know which clothes she should pack. Groups were given worksheets to find out what season was for them to draw, cut and colour four different clothing items to add to Joana's suitcase. The exercises were corrected and validated by the teacher. Groups who finished the activity on time won a star and stuck it on the leaderboard (those who didn't finish had five more minutes). Then, groups presented their choices to the class. The CDs *Development & Accomplishment, Empowerment of Creativity & Feedback*, *Social Influence & Relatedness* and *Scarcity & Impatience* are the motivators (Chou, 2016).

Session 3 started with pre-, while- and post-reading activities of another story: Joana has arrived at the Middle East. As a pre-reading activity, the teacher wore a *hijab* and asked pupils some questions about it, while an atlas was projected on the whiteboard. Then, three other traditional clothing items were presented (a *kipá*, a *chogu* and a *qipao*). Afterwards, the story's cover was explored, groups were given a questionnaire about the story to fill in during the storytelling moment. Then, they checked their answers in the group and with the class. They won a star for each correct answer and stuck it on the leaderboard. The story ended with Joana's next journey. To find out the new destination, pupils had a postcard from Joana inviting them to travel with her. Then, they received a suitcase in which there were four envelopes numbered from 1 to 4, with consolidation exercises. Pupils discussed, shared, and checked their answers with their groupmates and the teacher. Those who finished within the allotted time won a star. Worksheets were corrected together with a PowerPoint presentation. These strategies and practices, when combined with strangeness, storytelling, and decision-making, trigger the CDs

Development & Accomplishment, *Empowerment of Creativity & Feedback*, *Social Influence & Relatedness* and *Scarcity & Impatience* (Chou, 2016).

Session 4 took place in the computer room. Pupils opened envelope number five with a clue from Joana: new worksheets with a set of numbered dashes. To solve the challenge, pupils had to look up the answers on worksheets 1 to 4, filling in the gaps to find the mystery word (each group had a different word). Those who finished within the time limit (five minutes) won a star to place on the leaderboard. Afterwards, they voiced the mystery word, a clothing item, to the class and they were asked if they knew what it was and what they knew about it. Then, they were challenged to find more about it, using the school's computers: what it was; country of origin; why people wore it; who wore it. They could also look for pictures and other information they might find relevant. Their quest was conducted in English and the information was written in their notebooks, together with a drawing of their group's clothing item. They had 15 minutes to carry out the activity. Finally, groups presented the results to their colleagues. The development of computer-based/search activities in a collaborative problem-solving context stimulates *Epic Meaning*, *Development & Accomplishment, Empowerment of Creativity & Feedback, Ownership & Possession and Social Influence & Relatedness* CDs (Chou, 2016).

Due to the contingencies imposed by the SARS COVID-19 pandemic crisis, teaching activities were suspended March 13. Classes were taught using the Zoom-Colibri platform and restarted on April 14. The class timetable was readjusted, and pupils had English in two blocks of 45 minutes and 30 minutes respectively. Three 30-minute sessions were devoted to writing, carrying out groups' stories in a Powerpoint presentation, based on fact-finding and choices (sessions 5, 6 and 7). Pupils searched for: characters in animated format; common names given to people in the respective countries; country information; greeting and farewell forms in the native language; other information they considered relevant. They didn't have much experience in conducting online search and making PowerPoint presentations, and they needed the teacher's help. Then, groups wrote down their stories. In the following session, groups presented their stories to the class (session 8). We can encounter Chou's (2016) CDs: *Development & Accomplishment*, *Empowerment of Creativity & Feedback, Social Influence & Relatedness,* and *Unpredictability & Curiosity* CDs.

In sessions 9 and 10, groups wrote three multiple-choice/true-false questions about their texts in Google Forms. Then, they answered the group questions and teams that got most points won a star, which was stuck on the leaderboard. We can find the CDs motivators *Epic Meaning & Calling, Empowerment of Creativity & Feedback, Social Influence & Relatedness* and *Unpredictability & Curiosity* (Chou, 2016).

In session 11, pupils read a message from Joana, that had a link of Hamze's video[7], an Iraqi boy who lived in a refugee camp in Greece. Pupils were given a small challenge, that aimed at finding solutions to help children living in refugee camps. We can find the *Empowerment of Creativity & Feedback, Social Influence & Relatedness* and *Unpredictability & Curiosity* CDs (Chou, 2016). In the following session, answers were presented and discussed with the class. It ended with the counting of stars and the winning team was revealed. The reward was chosen by the winners: a set of activities to be done in class. Here, we can check *Epic Meaning & Calling, Development & Accomplishment, Empowerment of Creativity & Feedback, Social Influence & Relatedness, Unpredictability & Curiosity* and *Loss & Avoidance* CDs (Chou, 2016).

[7] https://www.youtube.com/watch?v=tkkVnQEB1mE&t=4s

The last was a session with a guest from Jordan, who introduced his country, from landscapes to traditions, using PowerPoint, and dialogued with pupils in English. *Empowerment of Creativity & Feedback* and *Unpredictability & Curiosity* CDs are the CDs that can be found (Chou, 2016).

ANALYSIS AND DISCUSSION OF DATA

Data analysis was based on aprioristic categories and descriptors, which were the assessed skills throughout the sessions (presented in Table 1) and Chou's CDs, respectively. They were based on the theoretical framework - the "Collaborative Problem Solving Measures in the Programme for International Student Assessment (PISA)" framework by He et al. (2017) - and the Portuguese curricular documents for this language learning cycle: "Metas Curriculares de Inglês Ensino Básico: 1º, 2º e 3º Ciclos" (Bravo, Cravo, & Duarte, 2015) and "Aprendizagens Essenciais|Articulação com o Perfil dos Alunos" (Ministério da Educação, 2018). The first framework focuses on social and cognitive skills involved in context of CPS activities, claiming that the combination of both reflects students' proficiency in CPS. The choice for these two documents finds justification in that they are two references of the curriculum for the teaching and learning of this subject in primary education in Portugal. Both documents include guidelines of what students should be able to develop during that school year. As the focus of our text is reading and writing, we focused only on the indicators of these two skills. The categories were validated by three external researchers, to reduce bias in the coding and interpretation of the data.

The following tables (tables 2, 3 and 4) present the categories that were the basis of the data analysis and their description, respectively.

Table 2
Categories of analysis: reading and writing assessed skills (adapted from Bravo, Cravo, & Duarte, 2015 and Ministério da Educação, 2018)

Categories	Description
Reading known words	Evidence revealing that pupils are able or not to read known words
Writing known words	Evidence showing that pupils are able or not to write known words
Reading comprehension of short sentences	Evidence denoting that pupils are able or not to read and understand short sentences
Reading comprehension of short texts	Evidence showing that pupils are able or not to read and understand short texts
Writing short sentences	Evidence indicating that pupils are able or not to write short sentences
Writing short texts	Evidence revealing that pupils are able or not to write short texts

Table 3

Categories of analysis: social skills (adapted from He et al., 2017)

Categories	Description
Participation	Evidence demonstrating that pupils participate or not in carrying out the activities
Perspetive taking	Evidence showing how group peers' perspectives are perceived among them
Collaboration	Evidence revealing how pupils organised and worked together: how they organised themselves; and how they perceived, explored, and solved the challenges

Table 4

Categories of analysis: cognitive skills (adapted from He et al., 2017)

Categories	Description
Decision making	Evidence showing that pupils make choices by identifying decisions, gathering information, and assessing possible solutions
Critical thinking	Evidence denoting pupils' ability to think critically
Creativity	Evidence showing that pupils are or are not able to express themselves or present solutions outside of what was expected

The following table (table 5) displays the descriptors considered in the content analysis and respective description. The descriptors, as previously mentioned, consist of Chou's (2016) eight CDs.

Table 5

Descriptors of analysis (adapted from Chou, 2016)

Descriptors	Description
CD1 Epic meaning	Evidence showing that pupils participated and engaged in the undertaken activities
CD2 Development & Accomplishment	Evidence that demonstrates pupils' interests in completing and validating the task
CD3 Empowerment of Creativity & Feedback	Evidence showing that pupils find creative solutions to solve the problems
CD4 Ownership and Possession	Evidence revealing how pupils respond (positively and negatively) and, their interest in the rewards system
CD5 Social Influence & Relatedness	Evidence denoting that pupils collaborate, compete, and show respect towards the others, autonomy, and responsibility during the tasks' accomplishment
CD6 Scarcity & Impatience	Evidence revealed by the attitudes of the group's elements that arouse feelings of frustration and/or impatience or their opposite
CD7 Unpredictability & Curiosity	Evidence showing pupils' engagement/curiosity about the following activity
CD8 Loss & Avoidance	Evidence demonstrating pupils' fear of making mistakes or failing

The analysis was supported by webQDA software, which enabled us to organise and systematise the data, boosting the dimensions' definition (Costa & Amado, 2018) that were crucial for the application of the investigative nature we intend to follow in this article: descriptive and qualitative. More specifically, we introduced in the webQDA's "internal sources" system the text and image files concerning the transcripts of the audio and video recording sessions, pupils' assignments, and Cloze tests. Then, we introduced in the "free codes" system the aprioristically defined categories of analysis (see table 1) and, in the "descriptors" system, we introduced the eight CDs to proceed to the triangulation of the information obtained. With this basis, we developed inferences, through reading and analysing the data, in an inductive way. The answers to each question were read, searching for patterns, and comparing the data.

After coding, three matrixes were generated (reading+/-[8] and writing+/-, social and cognitive skills+/-) and data obtained from different instruments (session's audio and video recordings and pupils' assignments). Their reading and analysis allowed us to conclude that there is a higher incidence of segments coded in *Epic Meaning* (CD1) and *Social Influence & Relatedness* (CD5), when compared with the remaining CDs.

It is possible to see in table 6 that reading and writing known words are found respectively with 95 ["*It's dress!"*][9] and 49 [*"p i n k s h o r t s!" Yes!*] coded segments in CD1 and 79 ["*T-shirt!" It's a hífen, not an "i". You're right]* and 40 [*I can help you! It's "b o o t s"*] in CD5. The same applies to ability in: a) reading comprehension and writing short sentences (with 21 ["*Look under the table*!"] and 22 *["It's winter"]* respectively in CD1 and 16 *[In the first one it is not "It's rainy"! It is "it's snowy"!*] and 17 *["Hanbok is a dress!*"] in CD5); b) reading comprehension and writing short texts (with 3 [*"The sari is a traditional clothing item, like a dress, worn by women"*] and 5 [*"The poncho is a big jumper. The poncho is traditional from Brazil, Colombia, Bolivia, Mexico, Peru and Ecuador. The poncho is the..."* no, no, no! *"The poncho is boy and girl!"*] respectively in CD1 and 3 [(…) *"it is a religious symbol! And it is worn as a formal and sanctified garment or symbol at weddings"*. I don't know how to write that!] and 2 [(…) *"garment with an opening in the centre to stick your head through and two small openings on the sides for your arms". Let's just write this down. "South America"*] in CD5). It can be inferred that pupils believed they were acting in an involved manner and that the social nature of the activities was strong. This is corroborated by the cloze tests results, which showed that pupils' means from one test to the next improved (first test 8,9 [SD 1,6]; second test 10,5 [SD 0,5]; and third test 15,3 [SD1,4]).

Table 6
Reading and writing matrix

Categories	CD1	CD2	CD3	CD4	CD5	CD6	CD7	CD8
Reading known words +	95	10	1	3	79	15	11	1
Reading known words -	2	1	0	0	0	0	0	0
Reading comprehension of short sentences +	21	0	4	0	16	2	1	0
Reading comprehension of short sentences -	0	0	0	0	0	0	0	0

[8] +/- added to a category represents the greater or lesser incidence of coded segments.
[9] For easier comprehension, we decided to translate pupils' voices into English.

Reading comprehension of short texts +	3	0	0	0	3	0	0	0
Reading comprehension of short texts -	0	0	0	0	0	0	0	0
Writing known words +	49	7	0	1	40	7	2	1
Writing known words -	3	0	0	0	3	1	1	0
Writing short sentences +	22	1	3	0	17	3	1	0
Writing short sentences -	2	0	0	0	2	0	0	0
Writing short texts +	5	0	0	0	2	0	0	0
Writing short texts -	0	0	0	0	0	0	0	0

Regarding the matrix analysis referring to social skills (see table 7), as happened before, we found, once again, a higher incidence of coded segments in Epic Meaning (CD1) and Social Influence & Relatedness (CD5), more precisely, in the codes' "participation" (with 997 [Can I draw the woolly hat?] in CD1 and 990 [Quickly! Hurry up, hurry up, hurry up! Some teams are already finishing it! Oh, the letters! in CD5), "perspective taking" (with 162 [Each one does what they want to do and then we'll see...] in CD1 and 208 [Claire, is this not supposed to be like this?/ Yes, it is! It's being very difficult this one!] in CD5) and "collaboration" (with 544 [I saw the B and O and knew it was boots and gave it to Daisy to make and she did!] in CD1 and 672 [We can put them all together and then do the lyrics, can't we?] in CD5). We therefore believe that what we stated above is corroborated, as the students seemed to be willing to be engaged in the proposed activities, talking, listening to their groupmate's opinions, sharing knowledge, and organizing themselves as a group to carry out the tasks, distributing them and helping each other.

Table 7
Social skills matrix

Categories	**CD1**	**CD2**	**CD3**	**CD4**	**CD5**	**CD6**	**CD7**	**CD8**
Participation +	997	104	77	95	990	357	278	54
Participation -	16	2	1	2	19	31	9	4
Perspective taking +	162	13	15	9	208	52	37	5
Perspective taking -	65	1	7	1	93	44	12	1
Collaboration+	544	44	46	28	672	154	141	20
Collaboration-	55	8	1	8	56	54	13	6

Considering the analysis of the cognitive skills matrix (table 8), we could observe a major incidence in *Epic Meaning* (CD1) and *Social Influence & Relatedness* (CD5), as well: i) "decision making" code, we find 339 coded segments in CD1 [*I'm putting the blanks together. Does anyone have any blank pieces?*] and 353 in CD5 [*What's it like? Do we make it big or small? Big or small?*]; ii) "critical thinking" code, there are 169 [*Except it's*

not the karate kimono!] in CD1 and 147 [*Here is a girl with it. Now search in masculine to see if boys wear it. Look, male, there! Over there! Over there! They use both!*] in CD5; and iii) "creativity", with 30 in CD1 [*the hanbok could be a traditional dress for weddings there!*] and 35 in CD5 [*And what about a bra?/ What?/ You must wear a bra in summer!*]. This analysis shows that pupils were able to take a critical and active attitude towards the various tasks throughout the sessions, the different perspectives and alternatives presented by their peers, while they were looking for a solution to the given challenge.

Table 8
Cognitive skills matrix

Categories	CD1	CD2	CD3	CD4	CD5	CD6	CD7	CD8
Decision making +	339	22	30	17	353	61	63	10
Decision making -	13	1	1	0	13	10	4	0
Critical thinking +	169	19	27	27	147	45	32	4
Critical thinking -	6	0	0	2	2	4	1	0
Creativity +	30	1	9	0	35	4	12	0
Creativity -	0	0	0	0	1	2	2	0

The results of the last two matrices are consistent with the students' answers to the group assessment. Most pupils revealed that they: i) participated in the class challenges; ii) showed initiative; iii) presented ideas/suggestions for solving problems; and iv) asked for help when they felt they needed. In the same instrument, we could assess that they enjoyed working in groups, such as: i) sharing ideas; ii) listening to different opinions; iii) keeping to the time available; iv) solving the challenges without the teacher's help; and v) presenting the work to the class. Pupils also mentioned that they used different group strategies when solving the challenges, so they believed that was necessary to "discuss", "combine", "think a little to reach an agreement", "talk among ourselves, and with the help of the teacher" to "reach a joint opinion" that would meet everyone's ideas and opinions or through the voting system.

CONCLUSION

This paper intended to investigate how *Octalysis Framework*-based activities (Chou, 2016) can be conducive to fostering EFL learning of reading and writing by primary education pupils in a collaborative project-based learning context. Hence, a set of activities applied over 13 sessions were designed, supported by Chou's CDs. Data analysis allowed us to infer that the *Octalysis Framework* permits the design of pupils-centred activities, fostering their commitment in various formats, especially those that are challenge based. Similar results were found by Azizi, Tkáčová, Pavliková andJenisová (2020), Daud, Akmam and AlSaqqaf (2018) and Spanou and Zafiri (2019), despite their specific context wasn't a gamified one. We, as teachers, oversaw the whole process, which also allowed us to witness the motivation and the deployment of group work

strategies and soft skills (social and cognitive), throughout the activities and work produced by pupils (reading/writing known words and short sentences/texts). An improvement in the responses of pupils and their involvement in the tasks accomplishment is also evident and they can be confirmed in the test results and the analysis of data.

Regarding the development of reading and writing skills, we could notice improvements in pupils' performance, who carried out the activities, regardless of their design, almost always without the teacher's help. Throughout the sessions, we noticed that pupils were able and confident to: i) read aloud the exercises' answers and the sentences and short texts they wrote throughout the sessions; ii) search for and take information online to write a story; iii) read aloud the written stories to the class; and iv) design and answer a quiz on the story their classmates wrote on *Google Forms*. These improvements were also confirmed in the correction of the assignments and in the results of the cloze tests, that not only illustrate the pupils' progress, but also show that their learning has been effective.

We were also able to ascertain that although the activities designed by the teacher aimed at awakening a set of CDs, they were not reflected in the results obtained, with CD1 and CD5 being the predominant ones throughout the 13 sessions. It is possible that these CDs (*Epic Meaning & Calling* and *Social Influence & Relatedness*) are the result of organizing activities around collaborative problem-solving. It also explains our choice of title given that, in fact, pupils had to be summoned to work collaboratively while navigating in the English language learning, having contacted with different languages and cultures, and realising that it is possible to speak and understand and being understood in English even if you are not a native speaker or do not have a British accent.

We could also verify that the results were in line with what was recommended by Chou (2016): each activity should awaken at least one of the CDs of the designed *Octalysis Framework*. We believe that Chou's *Octalysis Framework* CDs do not necessarily have to be present in all activities, despite allowing the design of various and pupils-focused activities. The ones presented in our study reinforce the options we put forth in our approach making it possible for motivation and engagement to be highlighted.

There are, nevertheless, limitations to the present study, one of them being the use of the mother tongue during the sessions, and the other implications of the SARS-COVID confinement.

AUTHORS CONTRIBUTION

Conceptualization: M. F.; Methodology: M. F. and A. M.; Validation: A. M. and A. R. S.; Formal Analysis, Investigation: M. F.; Resources: M. F.; Writing – Original Draft Preparation: M. F.; Writing – Review & Editing: A. M and A. R. S.; Supervision: A. M. and A. R. S.; Project Administration: M. F.; Funding Acquisition: M. F.

ACKNOWLEDGMENTS

This work was supported by National Funds through FCT – Fundação para a Ciência e a Tecnologia – co-financed by FSE – Fundo Social Europeu – through the Programa Operacional Centro I.P., under Grant 2020.05481.BD.

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Received: April 14, 2022

Revisions Required: June 14, 2022

Accepted: July 14, 2022

Published online: October 31, 2022