

The EKUI methodology: pilot study on the contribution to the inclusive teaching-learning process

Henrique Gil
Age.Comm-Instituto Politécnico de
Castelo Branco
Castelo Branco, Portugal
[hteixeiragil@ipcb.pt](mailto:h Teixeiragil@ipcb.pt)

Daniela Saraiva
ESE – Instituto Politécnico de Castelo
Branco
Castelo Branco, Portugal
danielafilipassaraiva@gmail.com

Ana Gonçalves
ESE – Instituto Politécnico de Castelo
Branco
Castelo Branco, Portugal
anadeusgoncalves@gmail.com

Nataly Lopes
ESE – Instituto Politécnico de Castelo
Branco
Castelo Branco, Portugal
natalymonteiro96@gmail.com

Abstract— The present work intends to approach the EKUI methodology as a literacy strategy. Through a brief exploratory qualitative study, which despite being insipient, intends to give clues of the usefulness of the resource for future research. The EKUI methodology is designed to help identify, assess, and intervene in the skills necessary for learning to read, write, and communicate. The study has methodological options for the application of questionnaires to professionals who are applying the EKUI methodology in the current year. Furthermore, the methodology aims to applicate a semi-structured interview to professionals who have already applied the methodology in their pedagogical intervention, in order to validate its contributions. The results obtained show the importance of the EKUI methodology as a strategy of Universal Learning Design and, consequently, as a promoter of a reflective attitude in teachers. On the other hand, it also contributes to the identification and intervention in necessary skills for learning to read, write and communicate.

Keywords— *Accessible Communication; Digital Resource; Inclusive Education; Inclusive Literacy; Literacy; Universal Learning Design.*

I. INTRODUCTORY NOTE

The inclusive learning methodology that we have selected for this work is based on a multi-sensory and phonic matrix approach. The EKUI Alphabet resource is an inclusive educational material that aims at an accessible literacy strategy for all. Each letter (whether in the physical or digital resource) seeks to respond to different learning and communication challenges. Through this resource, the objective is to work on auditory discrimination, fine motor skills, visual and sequential memory, linguistic, phonological and articulation skills and, finally, citizenship skills.

This work is structured in two moments: a theoretical reflection based on a specific literature review on the importance of Universal Design for the Learning of an effective inclusion, namely of individuals who present the need for specific resources of accessible communication; and another of an exploratory nature on the contributions of the EKUI methodology in the inclusive teaching-learning process. Thus, the first part of the work presents a brief theoretical framework that makes an approach to Universal

Design for Learning and digital educational resources as promoters of inclusion and removal of barriers in learning and communication. The second part of the work presents the research methodology that supported this study: a qualitative analysis of questionnaires (applied to a sample of 23 respondents trained in the EKUI methodology) and, in order to triangulate these data, the content analysis of four interviews applied to professionals who use the methodology in their pedagogical intervention. The last part of the work presents the conclusions about the contributions made by the professionals of the methodology in the teaching-learning process. The main objective of the investigation is to validate the benefits of the EKUI methodology in the learning process, as a promoter of school and social inclusion.

II. THEORETICAL FRAMEWORK

A. Inclusion

We often associate Inclusion with children with specific needs, however, the perspective of an Inclusive Education involves all children and young people. As they point out [1] that the Inclusion process encompasses the entire diversity of students (whether by the pace of learning or by their culture) in the learning process. Through school inclusion, [2] advocates that “an equal opportunity for access and success is promoted, with the participation of all and respect for the individual and cultural diversity of students”. Thus, when we talk about an inclusive school, we aim at a school for all children and young people, regardless of their physical, intellectual, social or cultural conditions. An inclusive school is a space that promotes interaction, sharing and collaboration among all its stakeholders. It is a space that promotes citizenship skills, whether by respecting differences or by the cooperation it demands.

One of the challenges of inclusion is the demand it imposes on the school of an offer of education that responds, with success, to everyone and for everyone [3]. In this context [4] they state that inclusion starts with identifying the differences between students and developing inclusive approaches to teaching and learning. This implies a change in the practices of pedagogical intervention, as the inclusion of a child requires its recognition as a whole and not merely in pedagogical aspects, or even in stereotyped aspects.

It is understood that the concept of inclusion is a set of endless processes, a permanent search either for increased learning or for the participation of all [4]. This is a vision that must belong to all actors of educational intervention, as is the awareness that inclusion is an end that is never fully achieved.

B. Universal Design for Learning

EKUI emerges as a methodology that has a phonic and multisensory inspiration with a Universal Design for Learning (DUA). In order to consolidate a theoretical framework, [5] states that the DUA corresponds to a set of principles and strategies related to curriculum development, in order to reduce barriers to teaching and learning.

DUA is a curricular approach based on intentional, proactive and flexible planning of pedagogical practices, considering the diversity of students in the classroom. From the perspective of [6], the way each student learns is unique and a single and uncompromising curriculum approach does not guarantee learning opportunities for all students. Thus, the pedagogical practices supported by DUA offer accessible opportunities and alternatives for all students in terms of methods, materials, tools, support and forms of assessment, without changing the level of challenge, creates more learning opportunities.

They are identified by [6] three key principles as the cornerstone of the DUA, with the aim of making classrooms more accessible: providing multiple means of engagement, providing multiple means of representation, and finally, providing multiple means of action and expression. It should also be noted that the implementation of the DUA is enacted in Decree-Law No. 54/2018 [7] and aims to identify and remove barriers to learning and participation, in order to maximize opportunities for all students.

Citing [5], “the DUA approach allows teachers to develop work plans that take into account the diversity of students, considering what they learn, how they learn and why they learn”.

C. Accessible Communication

The EKUI methodology aims to act by removing barriers to learning and communication, which consequently eliminates barriers to participation. It is therefore important to mention, according to the American Speech – Language-Hearing Association [8], communication problems identify speech and language disorders. According to this definition, speech disorders include difficulties in voice, articulation and fluency, while language disorders involve difficulties in understanding or producing language, regardless of the symbolic system used [8]. In short, a language disorder may involve language form (phonological, morphological and syntax disorders), language content (the semantic aspect of language) and language function (the pragmatic aspect) [9].

The Augmentative and Alternative Communication Systems (SAAC) aim to develop communication skills and are associated with technologies that allow more functional ways to communicate. SAACs refer to a set of techniques, strategies, aids, which facilitate the communication of people with communication difficulties, reinforcing language development [10].

It should be noted that [11] distinguishes the definitions of augmentative and alternative communication. The first concerns complementary or supportive communication, assuming the dual objective of promoting and supporting speech and ensuring an alternative form of communication if the person does not learn to speak. It is pointed out by [10] as a means to facilitate the development of speech and cognitive and communication skills necessary for language acquisition. In turn, alternative communication corresponds to a different form of speech communication, for example: Portuguese Sign Language, Braille, writing, Morse code, etc.

In view of this brief framework of an Augmentative and Alternative Communication, it is also important to mention [12] in order to understand that accessible communication “is a means that enables every citizen to access knowledge and information”. In particular, it concerns the possibility of a hearing impaired person having access to a Portuguese Sign Language interpreter or an individual with intellectual and developmental difficulties having more time to perform the tasks.

D. Digital Educational Resources

Digital Educational Resources (RED) are defined by [13] as “digital entities produced specifically for the purpose of supporting teaching and learning”. As this is a broad definition, RED can be considered: educational games, computer programs, videos, tutorial programs, blogs, web pages, etc. In other words, RED's characteristics are educational purposes and storage in digital and multimedia support.

This digital tool, according to [14], allows a diversified offer of learning resources, that is, communication can be presented through text, image or audio (or simultaneously). This feature enables the individualization of teaching and learning processes and the innovation of pedagogical practices. Another advantage of these resources is the fact that they encourage the involvement of children and young people in the learning process, since they are interactive.

It should be noted that educational games of syllabic synthesis, identification of syllables and rhymes, syllabic manipulation, phonemic synthesis and correspondence, according to [15] are “introductory activities to reading and writing and that allow children to become familiar with the written structure of the word and associate it with the phonic form”.

E. EKUI Methodology

The EKUI methodology appears in 2015 and presents itself as an inclusive literacy and accessible communication tool. It is based on an eclectic model that uses four forms of expression and representation (Figure 1): (i) phonological (sounds), (ii) kinesthetic (Portuguese Sign Language), (iii) graphic (letters) and (iv) Braille. It aims to work the prerequisites for learning reading and writing (comprehension, vocabulary, alphabetic principle and phonological awareness), in children and young people, thus ensuring the accessibility of the educational process to all children. The first product is the EKUI CARDS, a deck of 26 cards with the letters of the alphabet with a combination of the four forms of representation.



Fig. 1. EKUI CARDS - EKUI Alphabet

The EKUI Alphabet methodology also integrates as a digital resource a mobile application available for smartphones and tablets on the Google Play Store. Next, we present the resources accessible through the application that aim at digital literacy: videos of the phonetic alphabet (Figure 2), videos of the Portuguese Sign Language alphabet (Figure 3) and a playful-didactic game (Figure 4).

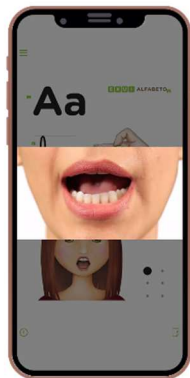


Fig. 2. Vídeos from the phonetic alphabet (EKUI)

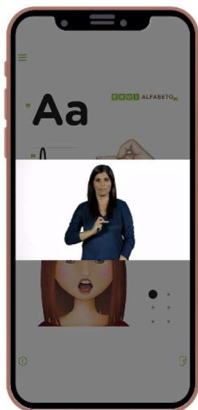


Fig. 3. Vídeos from the Portuguese Sign Language (EKUI)

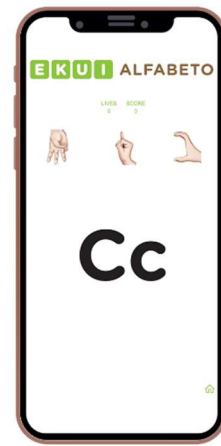


Fig. 4. Didactic game (EKUI)

III. METHODOLOGY

In the methodological scope, of a qualitative nature, it is presented as an exploratory and descriptive study. It can be considered a pilot study, albeit limited since the sample is small, however we believe it is a contribution to publicize the usefulness of this resource and that, at the same time, clues for future more in-depth investigations are evidenced. The analysis of questionnaires, applied to a sample of 23 respondents, who attended EKUI training during the current academic year 2020/2021, is preceded by the analysis of questionnaires. The survey was carried out using an online platform.

O The questionnaire is organized by sections:

- 1) Identification of respondents;
- 2) EKUI's contribution to learning and communication;
- 3) EKUI impact on the teaching process;
- 4) EKUI's contribution to inclusion;

5) Professionals' opinions on the EKUI methodology as a specific resource.

In order to support the aforementioned data, the aim is to triangulate information through the preparation of an interview, in order to carry out a comparative analysis of the data collected through the questionnaires. The analysis of the semi-structured interview will be applied to a kindergarten teacher, a primary school teacher, a Special Education teacher and a Speech Therapist who have used this resource. The choice of applying the interview to different actors in the development of children is based on the objective of preparing an analysis based on a systemic perspective. The interview was conducted in May and June 2021.

This interview aims to collect qualitative data regarding:

- a) Positive aspects of the EKUI;
- b) Limiting aspects (or obstacles) of the EKUI;
- c) Understand the differentiating potential of EKUI.

IV. RESULTS

A. Questionnaires

In the first instance, in the analysis of qualitative content and, in a global perspective, the universe of opinion of

professionals about the EKUI methodology is positive. There is an exception of 3 respondents who presented a general picture of negative opinion, however when faced with the latest opinion questions about the EKUI methodology as a specific resource, these responses were inconsistent, as they point to the methodology as essential/very effective or effective and everyone would advise the methodology to a colleague.

1) Section 1

Regarding the identification of respondents, nine (39.1%) are kindergarten teachers, five (21.7%) are special education teachers and another five (21.7%) are speech therapists. In a universe that also includes Portuguese Sign Language teachers, 1st Cycle Basic Education teachers and operational assistants. The majority age group among the respondents is between 32 and 41 years old (47.8%). The sampling represents a 100% female rate. On the other hand, most respondents had about 15 to 25 years of service (43.5%). It should also be noted that the entire group of respondents works or has worked with children with Educational Needs (NE).

2) Section 2

In the section referring to the contribution of the EKUI methodology in learning, there was a positive opinion in practically the entire section. An opinion with a high degree of satisfaction stands out (twelve respondents, around 52.2%) in terms of the ability to capture visual information, recognize the alphabet, articulate phonemes and learn to communicate. Despite maintaining a mostly positive outlook, it should be noted that: in the ability to write handwritten letter there are three (13.0%) negative responses; in the distinction between uppercase and lowercase, two responses (8.7%) were negative; and finally, with regard to the ability to write capital letters, 1 answer (4.34%) was highly disagreeing.

3) Section 3

In the section that aims to assess the impact of the EKUI methodology, all respondents consider that the methodology has a positive impact on the teaching-learning process (noting that in this section we observe more opinions that have a high impact). In a universe of twenty-three respondents, fourteen (60.8%) advocates that the methodology has a high impact on boosting new practices and increasing the reflexive aspect (metalinguistics). Thirteen (56.5%) state that EKUI has a high impact on stimulating children's desire to read; in the avoidance of repetitive sequencing and exercise mechanics; in the practice of a more conscious and systematized teaching; and finally, in changing the teaching-learning method of reading. It should also be noted that there was a negative opinion (4.34%) regarding the impact on the stimulation of students' written language.

4) Section 4

There is a general positive opinion regarding the contribution of the EKUI methodology in educational inclusion. It should be noted that the opinions of professionals show a greater contribution, especially in increasing the ability to include everyone in the group/context (52.2%). As indicated by a high contribution of the methodology, since it allows children without EN to relate to children with EN and that children

know different ways to communicate (52.2%). However, the remaining answers point to a great contribution from the other areas: eleven professionals (47.8%) indicate that it allows for a change in attitudes, reduces discrimination, meets the needs of all, creates equal opportunities and increases social participation.

5) Section 5

Regarding the opinions of professionals on the EKUI methodology as a resource, we summarized the opinions in the following table:

TABLE I. OPINIONS FROM THE PROFESSIONALS ABOUT EKUI AS A RESOURCE

	Ineffective	Effective	Very effective	Essential
Effect on student literacy:	0%	(21,7 %)	(52,2 %)	(26,1 %)
Effect on students' language and communication development:	0%	(17,4 %)	(65,2 %)	(17,4%)
Effect on the development of inclusive attitudes in students:	0%	(17,4 %)	(47,8 %)	(34,8 %)
Importance as a DUA strategy for the professional	0%	(13,0 %)	(39,1 %)	(47,8 %)

All respondents indicate that the EKUI methodology is effective. Regarding the effect on literacy, the development of inclusive attitudes, the development of language and communication in students, most consider it to be very effective. Regarding the importance as a DUA strategy for the professional, most consider it essential.

Regarding years of use, one of the respondents has been using the EKUI methodology since 2015, one since 2018 and four of them since 2019. The remaining respondents have used the resource since 2020, which reveals that most of the professionals surveyed have recent knowledge of this methodology.

It should be noted that only two (8.7%) respondents presented suggestions for improvements to the EKUI methodology, namely: "more materials for LGP" and "the application will be available for iPhones and laptops".

B. Interviews

Table 2 presents, in summary, the data collected through the interviews carried out.

TABLE II. CONTENT ANALYSIS

Positive aspects	Limitative aspects	Differentiating Potential
"learning the sign alphabet and braille makes them more motivated to learn to read."	"It does not have limiting aspects, but possibilities."	"literacy of children even those with difficulties and disabilities such as visual and hearing"
"in intervention in language difficulties"	"schools/groups do not invest in specific material for	"classroom differentiation through DUA"

	the use of the methodology."	
"inclusion among different students in the classroom"	"it should be known by more colleagues and with practical application in schools."	"Easily learn the phonemes associated with graphemes"
"in the acquisition of reading and writing processes"	"I don't know."	"knowing other types of languages and being able to communicate with everyone"
"equity, flexibility, comprehensiveness and tolerance for error."	"I have no limiting aspects to describe."	"early sensitize children to the difference"
"participation of children and families in the teaching-learning process"		"there are alternatives for children to learn in a visual, kinesthetic and auditory way"
"capturing visual information, identifying the sounds of words, decoding letters, establishing interpersonal relationships, develops fine motor coordination and eye-hand awareness"		"It's an excellent tool, not only for the child, parents, community, but for everyone, it works as a radar"
"In the pandemic phase, the APP and the letters help the Speech Therapists to provide articulation models"		"changes in the way we teach (because each student learns differently)"
"helps parents to support and complement the intervention made in the Therapy session, at home, through the APP"		"to overcome the specific difficulties of each child"

The application of the interview allowed the assessment of data collected through the application of questionnaires, demonstrating consistency between the responses of different professionals.

The positive aspects reveal the importance of the resource: in intervention in language difficulties, in the acquisition of reading and writing processes; in capturing visual information; in the association of graphemes and phonemes; in the establishment of interpersonal relationships (between peers); in the involvement of the family in the teaching-learning process; in fine motor coordination; in the oculo-manual awareness and finally, the equity, flexibility and tolerance to error that this methodology allows. We emphasize the importance of this resource in view of the current pandemic situation in which specialized teachers and technicians were unable to be the articulatory models themselves.

The limitations or obstacles highlighted by the interviewed professionals concern external aspects of the EKUI methodology and not internal aspects of the resource. On the other hand, the differentiating potential of the resource lies in promoting students' phonological awareness, the DUA strategy and the ability to communicate "with everyone within an Inclusive School".

One of the professionals interviewed states that "the diversity of students with different learning rhythms, cultures and diversified interests are part of today's school. Becoming aware of this reality is the challenge for all educational actors. The inclusive school seeks to respond to needs, providing effective and inclusive opportunities for everyone."

V. FINAL REMARKS

We can conclude, based on the collected data, that professionals have, overall, a very positive opinion regarding the contributions and impact of the EKUI methodology in learning and communication, in the teaching and inclusion process. All respondents recommend the use of this specific resource. One of the possible conclusions of the high satisfaction of this methodology is the novelty effect of this resource, however we note that six of the respondents have been using the methodology for at least two years and their answers show high satisfaction.

Based on the questionnaires, specifically regarding the identification of respondents, 39.1% are kindergarten teachers, which reveals a concern on the part of them to acquire skills in the early identification of problems in learning and communication of children in pre-school education. The early identification of factors associated with the risk of an eventual or continuous developmental delay prevents them from getting worse and leading to other issues, namely behavioral and emotional. Early identification is also part of the implementation of interventions aimed at reducing the impact of these factors, and as the professionals have identified, one of the contributions of the EKUI methodology in learning lies in the possibility of capturing visual information. For many children, it can be essential to detect effective learning difficulties, since children may only need more visual clues in the teaching-learning process (consequently allowing a greater recognition of the letters of the alphabet).

In an inclusive school, which integrates students with different problems and difficulties in accessing the curriculum, it is essential that teachers assume a flexible and reflective posture, which integrates the dynamization of new practices. It is important to understand inclusion as a permanent quest for increasing learning or for the participation of all, and going beyond the traditional teaching method that is not capable of responding to diversity in an educational context. The EKUI methodology, according to the opinion of the interviewed professionals, is identified (with a high degree of agreement) as a promoter of more conscious and systematized teaching.

For the construction of an Inclusive School – "A school for all" – it is necessary that all agents involved are moved by this sense of change, responsibility and respect for the diversity and individuality of each one. With increasingly heterogeneous groups, it is therefore up to each teacher to adopt strategies that encourage attitudes of reciprocity. Inclusive attitudes encompass not only a teacher-student dynamic, but also a student-student dynamic. The EKUI methodology allows children without EL to relate to children with EL, provides knowledge of different ways to communicate and consequently allows for the inclusion of everyone in the group.

As part of future investigations, it is suggested to apply the questionnaires to a greater number of professionals, interview professionals who have been using the methodology for a

longer time (since they have a better knowledge of the methodology and the novelty factor no longer influences) and finally, triangulation with the collection of the perceptions of children and young people. Another proposal lies in the use of instruments that effectively assess the phonological awareness of children and young people before and after the intervention with the EKUI methodology, such as social skills (inclusive).

Finally, quoting [16], “We have the right to be equal when our difference makes us inferior; and we have the right to be different when our equality mischaracterizes us. Hence, the need for equality that recognizes differences and for a difference that does not produce, feed or reproduce inequalities”. We have a duty as pedagogues, teachers and responsible for the construction of the future society, to honor the virtue of being progressive, and by virtue of fighting for equality and social justice.

ACKNOWLEDGMENT

Data referring to the questionnaires were provided by Dr. Celmira Macedo, in her capacity as responsible for the EKUI methodology, as founder and CEO of EKUI. To which we offer deep thanks.

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