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"I know how to do it in practice, but I don't know how to do it in grammar": reflections on the different mathematical knowledge of elderly people in the literacy process

"Yo sé cómo hacerlo en la práctica, pero no sé cómo hacerlo en gramática": reflexiones sobre los diferentes saberes matemáticos de las personas mayores en el proceso de alfabetización

"Je sais comment le faire en pratique, mais je ne sais pas comment le faire en grammaire" : réflexions sur les différentes compétences mathématiques des personnes âgées dans le processus d'alphabétisation

"Eu sei fazer na prática, mas não sei fazer na gramática": reflexões sobre os diferentes saberes matemáticos de idosos em processo de alfabetização

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Abstract

This article is the result of a study with seniors enrolled in a literacy class belonging to Youth and Adult Education (EJA) in the city of Uberaba - MG. The main objective was to know the reasons for leaving and returning to the school context of these literacy students and to highlight the different mathematical knowledge manifested by them during the research. To this end, an empirical study of a qualitative nature was developed, whose main data production tools were participant observations and semi-structured interviews. Both the records present in the field diary and the statements of the research subjects were objects of analysis in this study. The results indicate that these subjects have not previously experienced schooling processes due to a convergence of numerous factors, the main of which resided in the absence of an educational system that guaranteed their right to education, and currently, in the search for the realization of this right, they return with the variety of mathematical knowledge produced and mobilized through their social practices in different situations. We conclude by highlighting the need to

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move forward with new pedagogical practices in which these different mathematical knowledges are the focus of discussion.

Keywords: Education of young, Adult and elderly people, Literacy for the elderly, Mathematics teaching, Ethnomathematics.

Resumen

Este artículo es resultado de un estudio con ancianos matriculados en una clase de alfabetización perteneciente a la Educación de Jóvenes y Adultos (EJA) de la ciudad de Uberaba - MG. El objetivo principal fue conocer los motivos de salida y regreso al contexto escolar de estos estudiantes de alfabetización y resaltar los diferentes conocimientos matemáticos manifestados por ellos durante la investigación. Para eso, se desarrolló un estudio empírico de carácter cualitativo, cuyas principales herramientas de producción de datos fueron las observaciones participantes y las entrevistas semiestructuradas. Tanto los registros presentes en el diario de campo como las declaraciones de los sujetos de investigación fueron objeto de análisis en este estudio. Los resultados indican que estos sujetos no han vivido previamente procesos de escolarización debido a la confluencia de numerosos factores, el principal de los cuales residía en la ausencia de un sistema educativo que garantizara su derecho a la educación, y actualmente, en la búsqueda de la realización de este derecho, regresan con la variedad de conocimientos matemáticos producidos y movilizados a través de sus prácticas sociales en diferentes situaciones. Concluimos destacando la necesidad de avanzar con nuevas prácticas pedagógicas en las que estos diferentes saberes matemáticos sean el centro de discusión.

Palabras clave: Educación de jóvenes, Adultos y mayores, Alfabetización para las personas mayores, Enseñanza de las matemáticas, Etnomatemáticas**.**

Résumé

Cet article est le résultat d'une étude menée auprès de personnes âgées inscrites à un cours d'alphabétisation dans le cadre du programme d'éducation des jeunes et des adultes (EJA) dans la ville d'Uberaba - MG. L'objectif principal était de découvrir les raisons pour lesquelles ces étudiants en alphabétisation ont quitté l'école et y sont retournés, et de mettre en évidence les différentes connaissances mathématiques qu'ils ont exprimées au cours de la recherche. À cette fin, une étude empirique qualitative a été menée, dont les principaux outils de production de données étaient les observations participantes et les entretiens semi-structurés. Les enregistrements du journal de terrain et les déclarations des sujets de recherche ont été analysés dans le cadre de cette étude. Les résultats indiquent que ces sujets n'ont pas connu de processus

de scolarisation auparavant en raison d'une convergence de nombreux facteurs, dont le principal était l'absence d'un système éducatif garantissant leur droit à l'éducation, et qu'aujourd'hui, dans leur quête pour faire de ce droit une réalité, ils reviennent avec une variété de connaissances mathématiques produites et mobilisées par le biais de leurs pratiques sociales dans une variété de situations. Nous concluons en soulignant la nécessité d'aller de l'avant avec de nouvelles pratiques pédagogiques dans lesquelles ces différents savoirs mathématiques sont au centre de la discussion.

Mots-clés : Education des jeunes, Des adultes et des personnes âgées, Alphabétisation des personnes âgées, Enseignement des mathématiques, Ethnomathématiques.

Resumo

Este artigo é resultado de um estudo com idosos matriculados em uma turma de alfabetização pertencente à Educação de Jovens e Adultos (EJA) da cidade de Uberaba - MG. O principal objetivo foi conhecer os motivos de afastamento e retorno ao contexto escolar desses alfabetizandos e evidenciar os diferentes saberes matemáticos manifestados por eles durante a pesquisa. Para tanto, foi desenvolvido um estudo empírico, de natureza qualitativa, cujas principais ferramentas de produção de dados foram observações participantes e entrevistas semiestruturadas. Tanto os registros presentes no diário de campo, quanto os enunciados dos sujeitos da pesquisa foram objetos de análise deste estudo. Os resultados indicam que esses sujeitos não vivenciaram processos de escolarização anteriormente por uma convergência de inúmeros fatores, cujo principal residiu na ausência de um sistema educacional que assegurasse seu direito à educação, e atualmente, na busca pela efetivação desse direito, eles retornam com a variedade de saberes matemáticos produzidos e mobilizados por meio de suas práticas sociais em situações diversas. Concluímos destacando a necessidade de se avançar com novas práticas pedagógicas nas quais esses diferentes saberes matemáticos sejam foco de discussão.

Palavras-chave: Educação de pessoas jovens, Adultas e idosas, Alfabetização de idosos, Ensino de matemática, Etnomatemática.

"I have hands-on experience, but no schooling": reflections regarding different mathematical skills of seniors citizens seeking literacy"

The relationship between mathematics and education of seniors has been the subject of investigations for the last few years[3]. This article summarizes the findings of a study conducted in a literacy class for senior citizens at the Senior Care Unit (*Unidade de Atenção ao Idoso - UAI*), a public municipal institution in the city of Uberaba, Minas Gerais. The study aimed to assess the mathematical proficiency of these individuals within the context of their literacy seeking process.

According to international organizations and institutions, a significant portion of the global population lacks the ability to read and write, thus being deprived of their right to education. According to the 2016 global study by the United Nations Organization for Education, Science and Culture (UNESCO, 2016), an estimated 758 million adults worldwide lack basic reading or writing skills. This phenomenon has adverse effects on the social and communal aspects of individuals' lives. The United Nations Educational, Scientific and Cultural Organization regards the right to education as a fundamental element for exercising citizenship and engaging in society (UNESCO, 1997). In addition to UNESCO, the International Conferences on Adult Education (*Conferências Internacional de Jovens e Adultos - Confiteas)* also emphasize the significance of discussions surrounding access to elementary education, linking it to the protection of human rights and citizenship. These conferences shed light on the contemporary vulnerability experienced by individuals who lack literacy skills. According to the Brazilian Institute of Geography and Statistics (IBGE, 2023), there has been a decline in illiteracy rates in Brazil. Data specifically reveals a decrease from 6.1% in 2019 to 5.6% in 2022. Furthermore, the statistics indicate that, from the entire population of 9.6 million individuals aged 15 or older who lack literacy skills, approximately 54.2% are aged 60 years or older.

In recent decades, Brazil has undergone significant socioeconomic developments that have had direct implications on public education policies. Our society is predominantly focused on written communication and places significant value on the ability of its members to master fundamental literacy and numeracy skills in order to lead a respectable and independent life (Galvão e Di Pierro, 2012). In this context, public policies namely the National Educational Guidelines and Framework (*Lei de Diretrizes e Bases da Educação Nacional*, Brazil, 1996), as well as the Statute on the Rights of Senior Citizens (Brazil, 2003) have played an important role in safeguarding the right to education for individuals of all age groups; children, young adults, and senior citizens alike.

In addition to ensuring a right, the acquisition of mathematical knowledge significantly benefits individuals across various age groups, namely children, young adults, and seniors,

[3] Lima e Penteado (2013), Lima (2015), Scagion (2016, 2018), Silva, Silva e Julio (2021), Grossi (2021) and Silva e Julio (2023).

facilitating their complete engagement and inclusion in the relations established by society. Fonseca (2009) asserts that mathematical skills play a significant role in facilitating social interactions within our culture. The author contends that written language is utilized by individuals of various age groups in distinct contexts in their daily lives as a means to engage in social behaviors such as ordering, classification, quantification, measurement, and special orientation, among others.

The primary objective of the research outlined in this article was to examine the factors contributing to senior students leaving and returning to school, as well as highlight the different mathematical skills demonstrated by such individuals throughout the course of the research. In addition to our primary objective, we aimed to offer meaningful insights for reflection regarding the pedagogy of mathematics, focusing on emphasizing the significance of diverse forms of knowledge in fostering a socially-oriented teaching approach which is aligned with the learning objectives and unique traits of senior individuals. Furthermore, an additional objective of this research was to emphasize key observations and reflections that can provide a valuable contribution to the field of senior education studies. In order to enhance our comprehension of the subject matter, this article draws upon theoretical insights derived from research in mathematics education of children, adults, and seniors, as well as perspectives from the field of ethnomathematics.

Regarding the work conducted, the phrase 'adult literacy learners' was deliberately selected among the available alternatives for categorization. The study conducted by Galvão and Di Pierro (2012), showed that, within the context of contemporary Brazilian society, the word 'illiterate' is burdened with significant levels of bias and judgment, often associated with unfavorable connotations. Therefore, we refrained from employing the word.

By highlighting the relationships of seniors seeking literacy with mathematics, the objective of the present work is to challenge the longstanding pattern of social and symbolic devaluation that marginalizes and segregates these individuals. Through the valorization of their knowledge, particularly in the field of mathematics, we seek to explore the potential for using this knowledge as a foundation for teaching mathematics. The ultimate goal is to foster social inclusion, promote full citizenship, and facilitate active participation in society.

In addition a brief introduction and final considerations, this article has been structured in six distinct sections. Henceforth, we shall present relevant information pertaining to the prevailing issue of illiteracy in Brazil. In the next section, we will examine the pedagogy of mathematics education in the Youth and Adult Education (EJA) program, drawing from research in the fields of ethnomathematics and mathematics in youth and adult education. We will employ theoretical frameworks to analyze the diverse mathematical knowledge of youth and adult education students, with a specific focus on senior literacy seekers. The third and fourth sections deal with the context of the research and methodological choices, respectively. The fifty section expands upon the narratives provided by the participants, allowing for an in-

depth examination of the factors influencing their decision to discontinue and subsequently resume their educational pursuits. Finally, the sixth section is dedicated to the reflection upon the mathematical knowledge of seniors and the teaching of mathematics to this very specific group of participants in youth and adult education.

A brief history of illiteracy in Brazil

The colonial period in Brazil is widely acknowledged by scholars[4] as a significant initial milestone in Brazilian adult education. The Jesuits arrived in this period and initiated the process of catechizing the indigenous population. Aguiar (2001) states that educational initiatives were designed to cater not just to indigenous peoples of various age groups, but also to encompass the African community and Portuguese settlers. In this particular setting, Silva and Moreira (2019) highlight that throughout the period, the Jesuits not only provided instruction on Catholicism but also devoted themselves to teaching Portuguese. In the imperial period, a significant proportion of the Brazilian population aged five or older could not read and write. According to Strelhow (2010), with the departure of the Jesuits in 1759, the Brazilian educational system saw a significant decline, leading to the transfer of responsibility for education to the Empire. According to that author (2010), in that period "education was characterized by an elitist educational system in Brazil, which limited access to education to the affluent social classes" (Strelhow, 2010, p.51). Furthermore, the author notes that the dominant classes gradually established a monopoly over formal knowledge.

The introduction of free elementary education to all citizens was governed by Article 179 of the 1824 constitution. According to Cury (2022), an examination of the historical development of the right to education in the Brazilian constitutions reveals that, during the imperial period, there was a prevailing pattern of social exclusion. This was attributed to the fact that the enjoyment of civil and political rights in Brazil was limited to a minute portion of the population. According to Aguiar (2001), the constitutional precept mentioned in this context had limited practical significance, as, until 1890, 82% of the population was illiterate. Nevertheless, it operated as both a quantitative and qualitative principle, as the inclusion of the phrase "to all" furthered the endeavors to ensure education for the entire population.

Access to education in Brazil was limited until the end of the nineteenth century (Galvão and Di Pierro, 2012, p.57). In the subsequent decades, there was a significant reduction in illiteracy rates in Brazil. Souza (1999) investigated the correlation between demographic trends and the educational advancement of the Brazilian population, specifically focusing on the illiteracy rate indicator. The author acknowledges that the overall progress in literacy rates was contingent upon the educational systems' ability to effectively impart literacy skills to individuals across all age groups. The improvement can be observed through the analysis of the statistical yearbooks of Brazilian Institute of Demographics and Geography IBGE[5] (1995):

[4]Aguiar (2001), Silva e Moreira(2020) and Strelhow(2010).

[5] The methodological criterion used by IBGE considers literate individuals who have the ability to read and write a simple note.

Table 1.

Literacy rates of the Brazilian population aged 15 or older, over the decades (Souza, 1999, p.172)

Year	Literate	Illiterate	Did not declare	Literacy Rate (%)
1900	3 380 451	6 348 869	22 791	35
1920	6 155 567	11 401 715	-	35
1940	10 379 990	13 269 381	60 398	44
1950	14 916 779	15 272 632	60 012	49
1960	24 259 284	15 964 852	54 466	60
1970	35 586 771	18 146 977	274 856	66
1980	54 793 268	18 716 847	31 828	75
1991	76 603 804	19 233 239	-	80

Over the years, several literacy campaigns and programs[6] were established by the Brazilian government, specifically targeting young adults and individuals who did not complete basic education. This emphasis on educational expansion aimed to rectify the longstanding issue of limited access to public education experienced by previous generations. However, despite the significance of these programs, the analysis by Silva and Moreira (2020) shows that a characteristic of such initiatives was the discontinuity of their actions. As per the assertions made by the authors, the shift of power to new governments resulted in the interruption of existing literacy programs, followed by the implementation of novel initiatives that failed to acknowledge the endeavors of preceding administrations. Galvão and Di Pierro (2012) contend that a contributing factor to the recurrent nature of this phenomenon stems from the perception held by certain governmental authorities that public policies addressing adult literacy are of lesser significance. This perspective is based on the belief that allocating resources towards populations characterized by advanced age and limited productive lifespans yields limited social and economic benefit. This idea was expressed by the Education Minister of the government of President Fernando Collor de Mello, José Goldemberg, in 1991, during an interview to *Jornal do Brasil*.

"Illiterate adults have already found their place in society. It may not be the best place, but it is their position. Individuals may pursue occupations such as bricklayers, building

Campaign for the Education of Adults and Adolescents (CEEA), 1947; National Campaign for Rural Education (CNER), 1952; National Campaign for the Eradication of Illiteracy (CNEA), 1958; Popular Culture Movement (MCP), 1960; Basic Education Movement (MEB), 1961; National Literacy Plan (1964); Brazilian Literacy Movement (MOBRAL), 1967; among others. For more information, see the text by Silva and Moreira (2020)

[6] Campaign for the Education of Adults and Adolescents (CEEA), 1947; National Campaign for Rural Education (CNER), 1952; National Campaign for the Eradication of Illiteracy (CNEA), 1958; Popular Culture Movement (MCP), 1960; Basic Education Movement (MEB), 1961; National Literacy Plan (1964); Brazilian Literacy Movement (MOBRAL), 1967; among others. For more information, see the text by Silva and Moreira (2020)

security, garbage collectors, or other vocations that do not require literacy skills." Furthermore, he asserted that "adult literacy is unlikely to significantly affect the individuals' social standing and may potentially disrupt societal norms. Our primary objective will be to allocate our resources towards the development of reading skills among the younger demographic." According to Goldemberg, "the eradication of illiteracy can be achieved within a decade if immediate action is taken" (Goldemberg, 1991, p.4).

This statement reveals a prejudiced mindset and provides evidence of a management strategy that shows limited commitment to the right to education as guaranteed by the Constitution of 1988. Decisions informed by such reasoning often perpetuate the marginalization of individuals that lack literacy skills, impeding progress towards meaningful transformation in this particular context. Despite the predictions of the previous Minister of Education, it is evident that illiteracy persists in Brazil. According to recent data from the Brazilian Institute of Geography and Statistics, the illiteracy rate among individuals aged 15 and older in Brazil was recorded at 6.6% of the total population in 2019. Notably, this number significantly increases when focusing solely on the senior population, nearly tripling to reach 18%. (IBGE, 2020)

According to Galvão and Di Pierro (2012), in the present urban setting characterized by high levels of literacy, there is an increased demand for fundamental competencies such as reading, writing, and arithmetic, especially in relation to financial and bureaucratic matters. Individuals who lack proficiency in these skills are at a heightened risk of social vulnerability and are likely to experience subordination within social relationships. For the authors, focusing solely on investing in the education of children and adolescents hinders our ability to provide appropriate learning opportunities for young adults and seniors.

Mathematics teaching at the Youth and Adult Education program (EJA): a glimpse at other practices

Research pertaining to the mathematics education of young adults and seniors provides substantial evidence regarding the manner in which Youth and Adult Education students interact, relate, and utilize their diverse mathematical expertise. As stated by Fantinato (2004a, p.112), "the aforementioned research aims to consider the cognitive and/or cultural aspects of adult reasoning and behavior". This approach transforms mathematical knowledge generated in many situations into a subject of social investigation.

In the field of mathematics education for seniors, the works of Lima (2023) and Scagion, Rinck, and Penteado (2023) have given rise to significant insights and concerns for the present study. The study conducted by Lima (2023) involved a cohort of senior individuals diagnosed with Parkinson's disease. In that study, the author developed mathematical activities between 2011 and 2013. Lima (2023) emphasized the significance of recognizing and appreciating the experiences of senior learners within educational settings, while also promoting a dialogic atmosphere that encourages reflection about the mathematical concepts being taught. Similarly,

Scagion, Rinck, and Penteado (2023) underscore the significance of fostering an environment that promotes the exchange of ideas, doubts, and personal experiences. Despite being developed within university environments by means of extension courses, the contributions of these authors to the advancement of studies involving senior individuals are significant.

Additionally, we agree with Fonseca (2009) who asserts that individuals across various age groups, including young adults, adults, and seniors, continue to engage in interactions, generate, and apply mathematical knowledge in their daily lives, despite their disengagement from formal education. Therefore, incorporating this existing mathematical knowledge into the literacy process becomes a crucial endeavor, as it facilitates the establishment of connections between diverse mathematical abilities and promotes the successful integration of students into mathematics education.

Gelsa Knijnik (2003) conducted research on ethnomathematics. Knijnik argues that this area of study not only facilitates comprehension of diverse mathematical knowledge, but also prompts critical reflection regarding the Eurocentric discourses that dominate academic and school mathematics. By examining the effects of these discourses and the underlying power dynamics inherent to the policies that endorse specific curriculum content, ethnomathematics offers a valuable perspective on the broader implications of mathematical education curricula.

Additionally, it is worth noting that curricular approaches targeting individuals across various age groups, including young people, adults, and seniors, indicate that learning mathematics is contingent upon the students' existing knowledge (Brazil, 2001; Brazil, 2002). In line with the suggestion of Fantinato (2004b), our research was designed as a study that involved a horizontal analysis of a variety of mathematical knowledge. This analysis aimed to avoid the imposition of school mathematical knowledge onto the mathematical knowledge generated and encountered by seniors throughout their lifespans. According to the author, the examination of mathematical proficiency among individuals of different age groups, namely adolescents, adults, and seniors, at the intersection of ethnomathematics and Youth and Adult Education , requires a broader perspective beyond the confines of the academic environment (Fantinato, 2004b).

Moreover, Thees and Fantinato (2013) assert that the pedagogy employed in teaching mathematics to both young individuals and adults ought to diverge from the conventional classroom approach, taking into consideration the varying levels of maturity exhibited by the learners. The authors advocate for a pedagogical strategy grounded in the experiences of adult learners and the practical application of mathematics in their daily lives. They argue that “the introduction of real-life problems and scenarios into mathematics lessons provides valuable opportunities for the construction of meaningful understandings” (Thees e Fantinato, 2013, p.52).

In this sense, Pompeu and Santos (2019) point out that when individuals participating in Young Adults and Senior education programs go back to school, they bring mathematical

knowledge and experiences acquired from different contexts, wherein each one was able to produce and mobilize mathematical knowledge. The authors acknowledge the social nature of mathematics, as evidenced by the presence of various mathematical systems associated with diverse social and cultural contexts. In other words, they acknowledge that mathematical practices are shaped by social factors, and they define "mathematical practices as social activities in which individuals engage to generate, master, or reinterpret mathematical knowledge" (Pompeu & Santos, 2019, p.146).

The exploration and definition of pedagogical actions based on this knowledge can be achieved through the lens of ethnomathematics. Vilela (2009) emphasizes the potential of ethnomathematics, its use and reflective nature, in the comprehension of mathematical processes that function as distinct frameworks in various real-life contexts. In contrast, Knijnik (1997) highlights that students' exposure to formal mathematical knowledge presents opportunities for them to comprehend their individual methods for generating mathematical interpretations, thereby developing their own unique understanding of mathematics. Hence, access plays a crucial role in facilitating the learning processes.

Research Context

The literacy lessons were conducted at the Senior Care Unit (*Unidade de Atenção ao Idoso* - UAI), which is a municipal facility that provides a space for the care and socialization of senior adults. This is achieved through a range of free activities, as highlighted by Caetano and Tavares (2008):

> In order to organize and qualify several groups are established based on specific activities. These activities include stretching exercises, water aerobics, gymnastics, literacy classes, relaxation techniques, arts and crafts, music, physical therapy, group exercises, dance, and art. On-site professionals include social workers, physical educators, physiotherapists, pedagogues, counselors, and occupational therapists. (Caetano and Tavares, 2008, p. 623)

The physical space of the classroom is organized like a traditional educational setting, featuring rows of chairs and tables, a blackboard, and a storage area where the teacher stores didactic resources for instructional purposes. The class was formally affiliated with Adolfo Bezerra de Menezes Municipal School (EMABM). It is worth noting that being a public school, the instruction provided adhered to the norms of formal education. The class in question was a multigrade Youth and Adult Education (EJA) setting, specifically designed to cater to senior persons with limited literacy skills. Although not developed within a formal school environment, the primary objective of this program was to provide instruction regarding the Initial Literacy Cycle[7] to senior individuals with low levels of literacy.

[7] According to the resolution of the Municipal Education Council No. 03/2018, the first stage of elementary school I is called the Initial Literacy Cycle and aims to serve students within the age group corresponding to childhood,

Gadotti (2005) posits that formal education is distinguished by its explicit and precise goals, which are closely aligned with an educational framework, such as the school curriculum, in addition to well-established hierarchical systems. In the context of this particular class, it is noteworthy that it was situated within a non-academic institution, namely the Senior Care Unit (UAI). However, it is important to highlight that all the pedagogical aspects and operational procedures within the classroom were subject to the educational policies and regulations set forth by the municipality. Attendance was mandatory, there was a limit of absences stipulated for exclusion, the curriculum was aligned with the requirements outlined in the resolution of the Municipal Council of Education (Uberaba, 2018). As per the resolution, several subjects were deemed compulsory, including Portuguese, mathematics, physics, history, and geography.

According to the findings of Uberaba (2019), in the year 2018, efforts were made to centralize the focal point of the Youth and Adult Education service within the city. Consequently, enrollment was limited to only six municipal schools, with one of them specifically designated for senior learners. The practice of consolidating Youth and Adult Education (EJA) lessons resulted in the shutdown of classrooms, which, despite being euphemistically referred to as "nucleation," undeniably hampers access to education by limiting the availability of Youth and Adult Education (EJA) classes to only six educational institutions.

The Senior Care Unit is situated in a central area of the city, offering convenient accessibility. In fact, this was one of the reasons pointed out by Uberaba (2019) that justified maintaining the offer of classes for elementary school at Youth and Adult Education (EJA). It is important to point out that the two literacy classes of the Youth and Adult Education (EJA) program, held at Senior Care Unit (UAI), display distinct characteristics compared to other programs administered by the municipality. These lessons are conducted both in the morning and afternoon. So, in addition to serving as an exclusive space for senior learners, the literacy groups offer classes at distinct time slots compared to other Youth and Adult Education classes, thus indicating progress in municipal public policies targeting senior learners.

Furthermore, the institution's excellent infrastructure facilitated the engagement of seniors in various recreational and healthcare activities, in addition to their participation in literacy classes. As to the official statement from the municipal government, the designated area serves a purpose beyond facilitating social interaction. “the seniors are attracted by community rooms, which are considered therapeutic rooms, where dozens of seniors develop crafts, such as painting, embroidery, crochet and biscuit.” (Uberaba, 2013). Additionally, users were provided with psychiatric care, and a social event in the form of a ball was organized on Friday afternoons to facilitate leisure activities and foster social interaction among the participants.

Methodology

from 6 (six) to 8 (eight) years of age and/or those who did not have access to this Cycle at the appropriate age. (Uberaba, 2018)

As we were not interested in generating quantifiable or measurable data using alphanumeric variables, we decided to conduct a qualitative research study involving a group of learners focused on literacy. We opted for conducting this type of study, as this particular form of research:

> (...) enables researchers to obtain highly specific responses, characterized by a degree of authenticity and dependability that defies quantification. These entities can be examined and understood by considering their underlying meanings, goals, aspirations, beliefs, values, and attitudes. This analysis considers a broader context of interactions, processes, and phenomena that cannot be reduced to the operationalization of variables. (Ludke; André, 1986, p.43).

The data collection process involved the use of two distinct research methodologies, namely individual observation and semi-structured interviews. According to Minayo, Deslandes and Gomes (2008), individual participative observation is a method employed by researchers who embrace a qualitative paradigm. The methodology involves the researcher immersing themselves into the group surveyed, observing the study participants as they engage in their daily activities, with the aim of comprehending the experiential aspects of being in that particular circumstance. These included, among other activities, the presentation of mathematical concepts, resolution of exercises, clarification of doubts, and the correction of tasks.

The selection of interviews was based on the subjective information they contained, namely pertaining to the perspectives expressed by the interviewees (Boni & Quaresma, 2005, p. 72). Hence, it is important to have minimal knowledge of the individuals involved in this educational process. In pursuit of this objective, we conducted interviews with the participants, including students and one teacher, in order to gain a basic understanding of their background and their views on mathematics and mathematics within an academic setting.

During the latter half of 2019, we observed and documented the educational journey of fourteen senior citizens engaged in literacy studies. The class consisted of both male and female individuals, and the average attendance per session was ten students. The age range of the pupils varied between 60 and 84 years. In the table provided herein, we employed pseudonyms to refer to the students. In addition, we provide information regarding the participants' age, gender, and employment during the course of their lives, despite their retirement status during the study period.

Table 2.
Characteristics of participants

Student pseudonym	Gender	Age	Profession
Sebastião	Male	69 years old	Driver
Márcia	Female	60 years old	Housekeeper
Suzana	Female	68 years old	Farm worker
Cecília	Female	66 years old	Housekeeper and laundress
Custódio	Male	84 years old	Maintenance mechanic
Estevão	Male	80 years old	Bricklayer
Fausto	Male	67 years old	Construction foreman
Adélia	Female	64 years old	Housekeeper
Jorge	Male	72 years old	Farm worker
Vicente	Male	75 years old	Bricklayer e plumber
Carmen	Female	67 years old	Cook
Margarida	Female	65 years old	Housekeeper
Edite	Female	72 years old	Cook
Conceição	Female	71 years old	Hotel maid and clerk

Upon receipt of all necessary official authorizations, data collection began. The initial analysis of the data enabled us to infer shared observations and interactions between the students and the teacher, which generated the themes that would be subsequently discussed and analyzed. The Discursive Textual Analysis (ATD) approach was used in the categorization process. Moraes (2003) asserts that the utilization of ATD as a tool for qualitative research for textual analysis has facilitated the emergence of novel interpretations pertaining to the facts and occurrences examined. According to Moraes (2003), the technique might be conceptualized as:

> [...] a self-organized process for building comprehensions through new understandings which emerge from the iterative progression of three components: deconstruction of the corpus, unitarization, the establishment and categorization of relationships between unitary elements. This process culminates with the recognition and validation of the newly emergent understanding, as outlined by Moraes (2003, p. 192).

The term "*corpus*" refers to the data that is created, developed, or acquired during research. According to Moraes (2003), corpus refers to the collection of documents generated during the research process, including interview transcripts, observation recordings, written statements such as notes, and diaries; or existing materials, such as reports, different kinds of publications, editorials from periodicals, assessment results, and various types of minutes, among other sources. In this study, we utilized transcriptions of interviews and field diary notes to generate categories through a *post hoc* categorization process. This process involved grouping similar elements, thereby facilitating the generation of novel discussions, interpretations, and understandings regarding the subject matter. .

The subsequent subject of our discussion will be the identification as well as understanding of the issues that emerge from participants' statements during the interviews and classroom observations regarding mathematics.

In the following section our discussion will focus on the identification and understanding of the issues derived from the statements of the participants in the interviews and observations of mathematics classes. The data will be presented in two categories: the first entitled "*I'm going to UAI, I heard I can study there*"; reasons for leaving school and for returning after leaving; in which personal issues that influenced a lack of formal education in the participants' early years are discussed. The second category is entitled "*I have hands-on experience, but no schooling"*; mathematical proficiency of seniors seeking education; focusing on analyzing selected statements made by the participants and reflecting on the potential of mathematics education to validate and engage with diversified mathematical knowledge in the classroom.

"*I am going to UAI, I heard I can study there*": reasons for withdrawing from and re-entering the school environment

One of our primary goals was to emphasize key observations and comments with the intention of making a valuable contribution to senior citizen education research. In order to do so, it is important to acquire a comprehensive understanding of these individuals, as well as an awareness of the underlying factors that contributed to their situation. Research conducted by Arroyo (2006), Cortada (2014), Di Pierro, Joia, and Ribeiro (2001), and Fonseca (2009) highlights the need for understanding the individuals participating in the Youth and Adult Education (*EJA*) program and their unique characteristics.

> This study sought to ascertain the factors contributing school withdraw among seniors. Among such factors, the most prevalent was the necessity to seek employment. Accounts offered by Sebastião, Custódio, Fausto, and Jorge have demonstrated that

employment constituted a significantly detrimental influence on the educational experiences of these individuals during their formative years.

"I had to stop going to school to work, you see. I had no time to study…" (Sebastião, 69 years old);

"I was born and raised in the middle of nowhere, and nobody even talked about school. (...) I had to work to survive." (Custódio, 84 years old);

"Because, at the time, I used to work in the farm, there was no school in the countryside. When I moved to the city, I was an adult, I came to work, and I had no time to study." (Fausto, 67 years old)

"At the time I had to work to help my parents financially. (...) we all started to work very young, to help support the younger ones. So, I couldn't go to school." (Jorge, 72 years old)

According to Santos (2003), the imperative of maintaining employment is a prominent determinant which leads students to discontinue their education, thus resulting in delayed enrollment at a later stage in their lives. A similar phenomenon was observed among a subset of seniors who participated in this study.

Some additional factors emerged as significant during the interviews. In the early stages of their educational endeavors, the participants declared that decisive actions on the part of their families impeded or hindered their pursuit of further studies. There were a range of contributing factors to this phenomenon, including limited familial support and prohibition. Suzana, Vicente, and Conceição have reported that:

"My father used to say that women needed no education… My brothers went to school, and I stayed home looking after my baby brothers. I didn't think that was right, you know? Because I wanted to go, but there was no way I could. First, because my father said that women could not study, and also because I was the oldest and needed to stay home and look after my younger siblings." (Suzana, 68 years old)

"At that time, parents did not worry about the education of children." (Vicente, 75 years old);

"I was raised by my father. And my father was very possessive of us, of me. I would start studying, he would go to school and pull me out of school, you know ?" (Conceição, 71 years old).

Narvaz, Anna, and Tesseler (2013) conducted a study which revealed that the need to undertake familial and domestic duties emerges as a prominent factor contributing to the discontinuation of the education of girls. The authors assert that a cultural belief has led to a historical exclusion, wherein women are expected to prioritize their reproductive responsibilities and confine themselves to a private sphere within the home, based on the notion of their inherent suitability for motherhood. In addition to impeding women's access to educational institutions, another issue of equal significance pertains to the universally limited opportunities for school enrollment.

The influence of the home setting on the educational experiences of participants in Young and Adult education (EJA) was significant. However, it is crucial to note that access to schooling was restricted to certain groups, and there were few public policies in place to provide equal access to education.

Cury (2022) outlined the contentious aspects pertaining to the right to education as delineated in various iterations in the Brazilian constitution. Furthermore, the author underscores the significance of the National Educational Guidelines and Framework (Lei de Diretrizes e Bases da Educação, Brazil, 1996) in ensuring universal access to educational institutions. The text incorporates Youth and Adult Education into constitutional principles, aiming to address the historical reliance on temporary government programs for the implementation of this modality of education.

Moreover, it is crucial to understand not only the factors that led participants in the literacy class to discontinue their studies but also the factors that motivated them to re-entry the educational setting. The findings from the interviews indicated that the senior participants actively enrolled in the literacy program with the explicit goal of acquiring knowledge and skills. The older students in the Youth and Adult Education program are be characterized by the absence of a pursuit for diplomas and better qualifications to secure improved employment opportunities.

Unlike other audiences participating in the Youth and Adult Education program, who seek to complement their basic education solely for obtaining a diploma or better professional qualifications, these individuals are primarily driven by a genuine thirst for knowledge. They demonstrate this desire by citing specific instances that demonstrate the enhancement of their social integration into the broader society. According to their responses, the motivations for their decision to resume their studies are linked to the practical demands of daily living and are rooted in their intrinsic desire for literacy acquisition.

> "It matters! I matters a lot… Even to go to the doctor… fill out forms… you have to fill out forms. If you want to vote, you must know, right? If you go to the bank, and you need to deposit money, you need it (*to read and write*)..." (Cecília, 66 years old)
> "It is because I saw everybody blossoming… growing, you know? Reading, right? Using some fancy words. Then, I thought to myself "why can't I talk like that, too? (...) Many things that I didn't know I learnt here. For me enrolling in this course was very important." (Jorge, 72 years old)
> "You go to a place, and you know nothing... It is pretty hard; you have to ask other people everything." (Margarida, 65 years old)

We agree with Marques and Pachane (2010) and Pinheiro (2009) who, when discussing senior citizens education, emphasize the necessity of considering pedagogical approaches that integrate such individuals into society. Moreover, in addition to their individual interests, some characteristics of the literacy class also contributed to attract these students to the classroom. Classes took place in the morning and afternoon and, in contrast to the typical composition of Youth and Adult Education programs, which often encompass a diverse range of age groups, the Senior Care Unit (UAI) literacy program was tailored exclusively for seniors.

Several reports have indicated that the enrollment of individuals from various age groups in Youth and Adult Education programs, previously attended by the seniors participating in this study, played a significant role in their decision to discontinue their education.

> "There was no way to do it, youngsters wouldn't let me study, teenagers. I tried to attend Nisa (the school) three times, but none worked out. It was a terrible thing. They left the classroom and disrespected the teacher. I began to confront them when they got into an argument with the teacher. I thought to myself, "No, this is not going to work." I then announced, "Guys, I'm heading to UAI because I heard you can study there." I came and stayed here after that. Here, I fit". (Margarida, 65 years old)

When considering the education of seniors, it is essential to acknowledge the underlying factors that motivated their decision to pursue further studies. These individuals recognize the significance of the academic setting in their current stage of life and deserve to fulfil their aspirations and expectations. In an interview conducted by Morrone and Oshima (2016) for Época Magazine, Maria Clara Di Pierro emphasizes the importance of strategically structuring the educational environment for Youth and Adult Education classes. Such preparation is crucial as it considers the unique characteristics and needs of students when they reintegrate into the school setting. According to Di Pierro, individuals who have not attained formal education possess a cultural foundation and a substantial reservoir of experiential knowledge. According to Morrone and Oshima (2016), such individuals have acquired problem-solving strategies, developed professional knowledge, and created familial bonds. In light of this, we contend that educational environments targeting the senior demographic should function as spaces for the acquisition and application of knowledge and experiences, while concurrently serving as catalysts for social integration within their lives.

In the following section, our attention will be directed towards the examination of instances wherein students articulate their thoughts and opinions regarding contexts that encompass mathematical knowledge, to varying degrees.

I have hands-on experience, but no schooling": reflections on different mathematical knowledge of senior citizens within the literacy process

The purpose of this category is to highlight the moments in which senior students demonstrated their mathematical knowledge and examine the influence of various mathematical experiences on learning and teaching mathematics within the literacy process. Through the examination of interviews and participant observation, the researchers were able to discern the characteristics of the mathematical knowledge possessed by seniors, as well as how they utilize this knowledge. This investigation has shed light onto the seniors' understanding of mathematical concepts and the significance of their experiences in the development of mathematical knowledge.

When questioned[8] about the use of mathematics in their day-to-day lives, most senior individuals demonstrated the ability to recognize instances in which they were able to use mathematical knowledge in their own experiences. The senior students provided evidence of their use of mathematical resources in various practical scenarios, including *household tasks* (Sebastião, Márcia, and Cecília), as well as the management of household finances (Custódio, Carmen, and Conceição). Additionally, these individuals demonstrated the application of mathematical skills in professional experiences, such as in the field of construction (Estevão, Fausto, and Vicente), and in commerce (Suzana and Jorge). The table below contains a compilation of statements provided by the senior participants throughout the interviews.

Table 3.
Contexts for mobilizing mathematical knowledge derived from participant reports

Day-today situations	**Professional situations**
Domestic Activities "When I am cooking, for instance, I need to know the doses, right? I need to know the recipe. (laughs) That is mathematics, isn't it?" (Sebastião, 69 years old) I have a bed (of plants) at home. When I'm there I plant. (...) sometimes when I plant, I only have one pot. The kind that is long, it's a square, but it's a long square, so it's a rectangle, I measure the centimeters so that the plant doesn't get too suffocated, then I measure the spans" (Márcia, 60 years old) "There's when we make homemade soap, right? You *seen* it? We put five liters of oil, two liters of water, one kilo of soda ash. It's math too, right?	Construction "I was a bricklayer. I did everything; worked with tiles, flooring, stone, finishing. For example, you need the footage of a wall, you have to multiply it. For example, it is 3 meters. No... it's two eighty by three. Three times eight, eight and eight sixteen, so it's twenty-four." (Estevão, 80 years old) "I am a foreman at a construction. I understand things in practice, but reading, for me, is a struggle. I could never become a master builder because I could not read.(...) I learned mathematics by trial and error, I needed to. (...) I would measure and used mathematics. For instance, if I needed to calculate three times three,

[8] The question was: "Do you use, or have you ever used mathematical resources/thought during the conduction of your activities? Which ones?"

Two spoonful of bicarbonate, and then you whisk it (...) There's also the clothes. My machine holds thirteen kilos… that's a base too. I only put jeans with jeans, blacks with blacks." (Cecília, 66 years old)

Domestic Finances

"When we're at home, let's say the end of the month, the end of the month is coming... we sit down and do the math for the next month. How much we are going to receive, we have to pay this, we have to pay that much… That's what we do" (Custódio, 84 years old)

"Too much, I think… Paying bills, there are a lot. (...) I put everything on the edge of the paper in the notebook. Pay so-and-so, so-and-so, so-and-so, so-and-so… I put the amount. Then I do the math, how much I have to pay, but my salary isn't enough.. (Carmen, 67 years old)

"...Yes there is one. I live with my daughter (...) I got some money and had the gate painted… did some maintenance around the house... now we need the rest, and when I receive it, I will fix the rest of the house. (...) I put a little aside according to my budget." (Conceição, 71 years old)

I would know it was nine square meters. I learned… I did not know how to read, but I could do math in my head. I learned out of necessity. (Fausto, 67 years old)

"I am a plumber, (I worked in) construction, I was bricklayer and welder. (...) For instance, to level a house... You have a 40 square meter job, you must measure. (...) You must divide. (...) exactly as it is marked in the blueprints, you must do it at the site" (Vicente, 75 years old)

Commerce

"Aham... you know, I sell my stuff (cosmetics via catalogue), then, I calculate the amounts I have to collect…" (Suzana, 68 years old)

"I used to work a lot with that business of delivering liters of milk, some to so-and-so and so-and-so, and I didn't put it in my notebook. (...). I milked seventy-two cows. I took everything out and divided it correctly. Without missing anything... I think it's better to do it in my head than in my notebook. (Jorge, 72 years old)

The accounts illustrate the seniors' awareness regarding social activities in which they applied mathematical knowledge to varying degrees. Occasionally, some of them tend to conflate mathematical proficiency with computational abilities. However, it is worth noting that other manifestations of mathematical skills can be observed. For instance, Sebastião exhibits proficiency in dosage calculations, Márcia demonstrates adeptness in measurement techniques, Cecília showcases her organizational skills by categorizing clothing based on their attributes, Custódio displays foresight in predicting financial expenditures towards the end of each month, Estevão employs various methods to measure land accurately, and Vicente employs strategies to ensure the proper alignment of land boundaries. According to Fonseca (2009, 2017), mathematical knowledge permeates various social behaviors and encompasses a range of skills, including quantification, ordering, measurement, categorization, spatial organization, shape recognition and use, among others.

Our observations showed that a significant portion of time in mathematics classrooms was dedicated to the resolution of problems involving computations and the application of algorithms. Nevertheless, these lectures did not prioritize the active engagement and acknowledgement of students' knowledge. During the interviews, an inconsistency regarding

Sebastião emerged, prompting a reconsideration of the contentious issues surrounding teaching mathematics to senior citizens. We focused our attention on the situation of a student who, during his formative years, resided in a rural area. During the course of his interview, he made the following statement:

> "You have to perform math there (in the farms) when you're planting, right? (...) You must calculate, say, a fourth of the patch of land... You must sow 20 liters of beans in one-quarter of an acre of land." "What is a quarter of that land?" "A quarter is... I'll explain in more detail: Divide an acre into four parts. You divide it into four equal parts. A plot is made up of four quarters. Half an acre is two quarters. So you must plan out how you will plant it. (...) Isn't this mathematics? You must do the calculation." (Sebastião, 69 years old)

This account demonstrates that the student successfully performed division concerning the planting areas and adeptly executed mental calculations requiring addition of fractional amounts. During a subsequent segment of the interview, when prompted to discuss challenges encountered in the process of acquiring knowledge in the realm of academic mathematics, the interviewee articulated the following response:

> "I cannot do all four operations; no… but those I can are enough to survive, aren't they?" "which one can't you do?" "Usually, division (...) I have a hard time with the pen (writing)... Let's suppose that you want to divide something... doing it on paper is harder. (...) People can do it on paper, but not in practice; I can do it in practice, but not on paper." (Sebastião, 69 years old)

The aforementioned accounts illustrate that, based on a familiar and personal experience, the student first exhibits proficiency in both mentally calculating division and adding fractions. The participant's subsequent assertion regarding his challenges with division prompted us to contemplate two questions. The first regarding the challenge of performing calculations based on written records, an issue previously highlighted by Santos and Pompeu (2020) as one of the mathematical competencies that senior students, given their limited or nonexistent educational background, struggle with, and which require attentive instructional intervention on the part of teachers. The second issue is regarding pedagogical practice. Despite the student's consistent ability to complete identical division activities, the instructional design failed to facilitate the recognition and utilization of the student's existing mathematical knowledge and understandings.

Based on observations of the participants, it was evident that there was a lack of debate and negotiation regarding the extracurricular mathematical expertise of senior students within the context of the mathematics classes. Silva and Nacarato (2011) advocate for the implementation of a novel problem-solving culture within adult education (*EJA*) classrooms. This approach encourages students to actively participate in the process of finding solutions,

thereby assuming the role of knowledge producers. It is crucial to emphasize that senior individuals have not ceased to engage with mathematical knowledge throughout their lifetimes. As previously stated, it is imperative to consider an educational approach that can effectively incorporate and address this knowledge within the school setting, as advocated by Knijnik (2001).

When questioned regarding the organization and planning of teaching activities, the teacher affirmed her adherence to the parameters delineated in the educational syllabus promulgated by the educational institution. Based on empirical observations, it became apparent that the teacher adhered to the prescribed textbook and consistently selected and implemented distinct activities in a manner closely resembling the exercises outlined in the book. According to her statement, “there is an yearly plan that is an integral component of the curriculum. I am responsible for teaching the content outlined in the curriculum.” This observation draws attention to the absence of instructional independence, as previously addressed by Fonseca (2009), as the teacher is provided with a predetermined curriculum and is required to adhere to its specifications.

Regarding the literacy process specifically, particularly when senior adults are introduced to formal mathematical practices and records, the teacher assumes a crucial role in facilitating and mediating the diversity of knowledge present in the classroom. The aforementioned case of Sebastião, serves as an illustrative example that underscores the potential correlation between various mathematical concepts that may have been disseminated and discussed within the educational setting, hence fostering the development of mathematical knowledge among students. In this particular context, the implementation of targeted teacher training programs for the purpose of working in the field of Adult Education (EJA) holds significant importance. It is essential that we promote the development of pedagogical practices that recognize and celebrate the strategies and approaches employed by senior learners in constructing their knowledge. This recognition is crucial when devising effective methods for supporting their comprehension of mathematical concepts within the educational setting. By doing so, we can facilitate the integration of these individuals into the school environment and foster a deeper understanding of the knowledge historically valued by educational institutions.

Regarding the discussion about the mathematics curriculum, Knijnik (2003) highlights the imperative of establishing the legitimacy of individuals’ knowledge within this domain. The author contends that the knowledge possessed by individuals holds pedagogical potential and should be incorporated into the mathematics curriculum. According to Da Silva and Mendes (2016, p.45), the phrase "*practiced-thought curricula*" is employed to describe curricular

models that "*do not adhere to a certain regular, logical, rational, or scientific sequence*. *Instead, these models consistently engage with the vitality of everyday experiences and events*. The authors believe that by incorporating many modes of cognition, action, reasoning, and emotion, these curricula have the potential to accommodate the various epistemological, practical, cognitive, and affective orientations of students.

Moreover, despite the fact that certain students were capable of recognizing the presence of mathematical thought and understanding in their everyday activities, it was evident from classroom observations that a significant number of students continue to struggle with identifying their role as creators of knowledge. Promoting among senior individuals the awareness that they actively contribute to the creation of mathematical knowledge via their daily experiences in routine activities, fosters self-esteem and engenders introspection regarding their own capacity.

The acknowledgment of their strategies for mobilizing knowledge and ways of being in society plays a crucial role in the pursuit of social inclusion for these individuals. It is imperative to consider a pedagogical framework that can effectively incorporate and facilitate the discussion of mathematical knowledge within the educational setting, as emphasized by Knijnik (2003). Specialized teacher education for practicing in the context of Youth and Adult Education (EJA) has the potential to foster a novel educational environment wherein educators prioritize circumstances that facilitate the interplay between diverse mathematical knowledge generated in various contexts. Moreover, such specialized education can also promote an atmosphere that encourages students to actively contribute their own insights into said knowledge.

In addition, it is crucial to develop instructional activities in the Youth and Adult Education setting that integrate mathematics with the everyday experiences of senior learners. This approach can address pertinent challenges encountered in their lives and provide practical applications of mathematical concepts that are inherently embedded in their daily routines, albeit often unnoticed (Pasquini, Carvalho, 2013, p.7). Proposals that involve situations already familiar to senior citizens, based on their prior experiences, hold significant importance within the educational setting. As Silva (2016, p. 384) asserts, when senior individuals are encouraged to share their life experiences, they not only have the potential to generate new knowledge but also to establish stronger social connections. By emphasizing the knowledge generated by seniors through situational contexts and problem-solving, it is possible to initiate a meaningful learning process, thus enhancing the efficacy of teaching.

Final Considerations

This article presents the findings of a study conducted in a literacy class specifically designed for senior citizens. The aim of this study is to critically examine the teaching of mathematics within the literacy curriculum for those students. The article advocates for a more inclusive perspective that acknowledges and accommodates the diverse mathematical knowledge of senior learners. By drawing upon the theoretical framework of ethnomathematics and mathematics education for young adults, adults, and seniors, this study has successfully identified key points and facilitated critical reflections regarding a pedagogical approach tailored to the education of senior individuals. Notwithstanding, it is crucial to emphasize that, in line with the theoretical framework employed, these findings should not be regarded as exhaustive.

The Senior Care Unit (UAI*)* literacy program revealed that senior learners, upon reentering the school setting, possess diverse mathematical knowledge and experiences similar to school-based mathematical knowledge. These factors significantly impact the manner in which such individuals engage with mathematical concepts throughout their journey toward literacy. This knowledge comprises a set of rules, criteria, and a distinct logical-mathematical reasoning framework. It is imperative that we integrate such knowledge into educational planning to enable seniors to engage in the process of literacy, fostering critical reflection and appreciation for their previous knowledge.

The reasons for leaving school led us to consider that these individuals were, in fact, conditioned to stay away from the classroom. The absence of public policies ensuring the accessibility and continuity of education for these individuals during their formative years, along with the emergence of other demands during the course of their lives, have culminated in the disruption of their educational pursuits and subsequent exclusion from the educational context. When designing instructional approaches, it is crucial to consider the learning objectives, prior knowledge, and the constraints imposed by advanced age. These strategies play a pivotal role in facilitating teaching that is tailored to the unique characteristics and needs of such individuals

The literacy program as a designated learning environment, within a recognized educational institution, must create conditions conducive to learning which enable learners to acquire knowledge that has been historically systematized through the discipline of mathematics taught in schools. Nevertheless, it is imperative to emphasize the significance of advancing towards novel pedagogical approaches for adult education (EJA), particularly those

that involve critical examination of students' mathematical proficiency. In order to effectively equip teachers with the skills to handle mathematical information derived from various experiences and social practices across diverse contexts, it is imperative to provide them with specialized education. This knowledge is not always expressed and systematized in the same way as school mathematical knowledge, however, it can significantly contribute to the understanding of the knowledge produced at school.

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