



EDUCATIONAL TECHNOLOGIES FOR TEACHING FIRST AID TO PARENTS AND EDUCATORS: AN INTEGRATIVE REVIEW

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ABSTRACT

Objective: To analyze the scientific evidence on studies on the development and/or validation of educational technologies for teaching first aid to parents and educators. **Method:** Integrative review study, with research question elaborated by the PICO strategy - Population, Interest, Context, selecting the descriptors "Parents", "School Teachers", "First Aids", "Teaching Material", "Educational Technology", "Validation Study". A search was carried out in six sources of scientific literature, in the period of June 2021. The inclusion and exclusion criteria were applied, then the data were extracted using a specific form, evaluated by level of evidence, analyzed and interpreted by the data reduction method. **Results:** The final sample quantified six studies, with low to moderate levels of scientific evidence, which stand out for the diversity between educational technologies such as a booklet, calendar, leaflet, poster and comic book for parents and educators who deal with the teaching of first aid. **Conclusion:** There was a scarcity of studies on the development and validation of educational technologies on first aid for parents and educators. It is recommended to invest in validated educational technologies that are easy to access and read and also allow the use of computerized resources in order to expand the population's access and also to cover accidents and incidents experienced in the home and school environments.

Keywords: Educational technology. First aid. Health promotion. Parents. School teachers.

INTRODUCTION

Childhood accidents are related to characteristics regarding child growth and development, housing conditions, social, educational, cultural, economic and lifestyle factors, which can harm the health of the children and their families^(1,2). In the home environment, the occurrence of accidents with children is linked to factors such as age, sex, stage of development, mobility, cognitive capacity, number of siblings and supervision of guardians⁽³⁾.

In the school environment, injuries from accidents can occur during recreational, sporting, and extracurricular activities, thus educators who accompany students in school activities must be able to adequately deal with

health problems and emergencies⁽⁴⁾. Attention in first aid, in the school environment, should be reinforced for students with physical, cognitive, hearing, visual and multiple disabilities, as it is a public that is conducive to accidents and related injuries⁽⁵⁾.

Estimates show that around 4,000 children under 14 years of age die each year from trauma, including domestic accidents, and, on mean, 117 thousand are hospitalized in the public health system for this reason⁽⁶⁾. External causes in children have significant morbidity and mortality, being identified as a serious public health problem that, in most cases, can be prevented^(3,7).

Based on the estimates, the knowledge of those responsible for minors about first aid is essential, since it consists of initial and

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temporary care to preserve life, reduce disabilities and minimize suffering, contributing to a good health prognosis in care definitive⁽⁷⁾.

Studies show that educators, parents and caregivers understand the importance and need for teaching first aid to effectively deal with incidents and accidents that occur at home and in teaching and recreation spaces; however, they feel the urgency of materials and specific training in first aid aimed at children⁽⁸⁻¹⁰⁾. The scientific literature has shown a scarcity of studies with good levels of evidence on educational interventions in first aid that carry out validation and evaluation of the effectiveness of the developed technologies⁽¹¹⁾, pointing to the need to survey studies on the subject for educators and lay people in order to enable health education and decision-making.

Educational technologies are innovative education strategies, useful in the teaching-learning process of the target audience, which can use didactic program resources, multimedia teaching tools, among others. The materials developed must be planned, practical, with simple and incisive language, in addition to combining the experiences of the population to strengthen the appropriation of knowledge in health care⁽¹²⁾.

Based on the above, the scientific literature sought to analyze the scientific evidence on studies on the development and/or validation of educational technologies for teaching first aid to parents and educators. This study may support the construction of new technologies, according to the identified gaps.

METHOD

The method of knowledge synthesis adopted in this study was the integrative review. To conduct this investigation, six steps were followed: 1) elaboration of the question/hypothesis; 2) search and selection of primary studies, based on inclusion and exclusion criteria; 3) data extraction; 4) critical evaluation of the included studies; 5) summary of results; 6) presentation of the review⁽¹³⁾.

The research question of the review was: what is the scientific evidence on studies addressing the development and/or validation of

educational technologies for teaching first aid to parents and educators?

The research question was structured through the PICO strategy – Population, Interest, Context: (P) parents and educators; (I) studies on the development and validation of digital technologies; (Co) first aid, which allowed the selection of the following descriptors from the Medical Subject Headings (MESH) of the National Library of Medicine National Institutes of Health (PubMed): “Parents”; “School Teachers”; “First Aids”; “Teaching Material”; “Educational Technology”; “Validation Study”.

In the second stage, to identify the primary studies, a search was carried out in the Latin American and Caribbean Literature in Health Sciences (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE) databases, Nursing Database (BDENF), Cumulative Index to Nursing and Allied Health Literature (CINAHL), through the Journal Portal of the Coordination for the Improvement of Higher Education Personnel (CAPES Portal), and in the virtual libraries Cochrane Library (COCHRANE) and Scientific Electronic Library Online (SciELO), in the period of June 2021.

For the search strategy in the data sources, the Boolean AND operator was used to associate the descriptors, applying the advanced search for the terms, obtaining 524 primary references. The description of the search strategy for data sources is summarized in Box 1.

For selection of studies, the following inclusion criteria were applied: English, Portuguese or Spanish, with text available in full and addressing the development and/or validation of educational technology in first aid for parents and educators. A time frame was not used in order to gather as much information as possible; however, the temporal trend found after the search was for publications in the period from 1998 to 2021. The exclusion criteria were also adopted: studies literature review, editorials and brief communication.

The search and selection of studies were carried out by two researchers/reviewers, independently and, in case of doubt or disagreement, a third researcher was consulted.

The process of identification, screening, eligibility and inclusion of studies in the review is illustrated in the Prisma flowchart in Figure

1, guided by the Preferred Reporting Items for Systematic Review and Meta-Analyses instrument⁽¹⁴⁾.

BOX 1. Number of references found for the intersections of the integrative review descriptors. Crato/CE (2021).

Search strategies	LILACS	MEDLINE	BDEF	CINAHL	COCHRANE	SciELO
"First Aids" AND "Teaching Material" AND "Parents"	0	1	0	0	1	0
"First Aids" AND "Educational Technology" AND "Parents"	0	0	1	0	2	0
"First Aids" AND "Validation Study" AND "Parents"	0	0	1	2	1	0
"First Aids" AND "Teaching Material" AND "School Teachers"	0	2	0	2	0	0
"First Aids" AND "Educational Technology" AND "School Teachers"	0	0	0	0	2	2
"First Aids" AND "Validation Study" AND "School Teachers"	0	0	2	1	1	1
"First Aids" AND "Teaching Material"	4	33	0	19	8	6
"First Aids" AND "Educational Technology"	1	0	3	1	14	5
"First Aids" AND "Validation Study"	0	3	6	54	1	7
"First Aids" AND "Parents"	3	252	7	146	36	16
"First Aids" AND "School Teachers"	5	130	12	78	13	16
TOTAL	13	421	32	303	79	53

Source: Own elaboration.

For the third stage of the review, data extraction took place through a data collection instrument developed by the authors, with the study identification variables (authors, year, database, language, location, objective), methodological characterization (type of study, sample, scenario, data collection technique, analysis) and applicability of the research question elaborated (teaching material or educational technology, target audience, context - validation/assessment, content covered).

In the fourth stage, the level of scientific evidence was assessed, using the criteria proposed by the Oxford Center for Evidence-Based Medicine⁽¹⁵⁾, according to the characterization of the study method, considering the following levels: 1A - systematic review of randomized controlled clinical trials; 1B - randomized controlled clinical trial with narrow confidence interval; 1C - therapeutic results of the "all or nothing"

type; 2A - systematic review of cohort studies, 2B - cohort study, 2C - observation of therapeutic results and ecological studies, 3A - systematic review of case-control studies, 3B - case-control study, 4 - case reports, including lower quality cohort or case-control studies and 5 - expert opinion devoid of critical assessment or based on basic materials⁽¹⁵⁾.

During the fifth stage, the analysis and interpretation of the results, the Whittmore data reduction method was used⁽¹⁶⁾. In the last stage of the review, the findings were presented in boxes, with a brief descriptive synthesis.

As this is a bibliographic study that is not directly linked to data collection with human beings, the integrative review carried out did not require an opinion from the Research Ethics Committee, as directed by Resolution 466/2012 for studies with human beings. However, the integrity and authorship of the documents used were preserved.

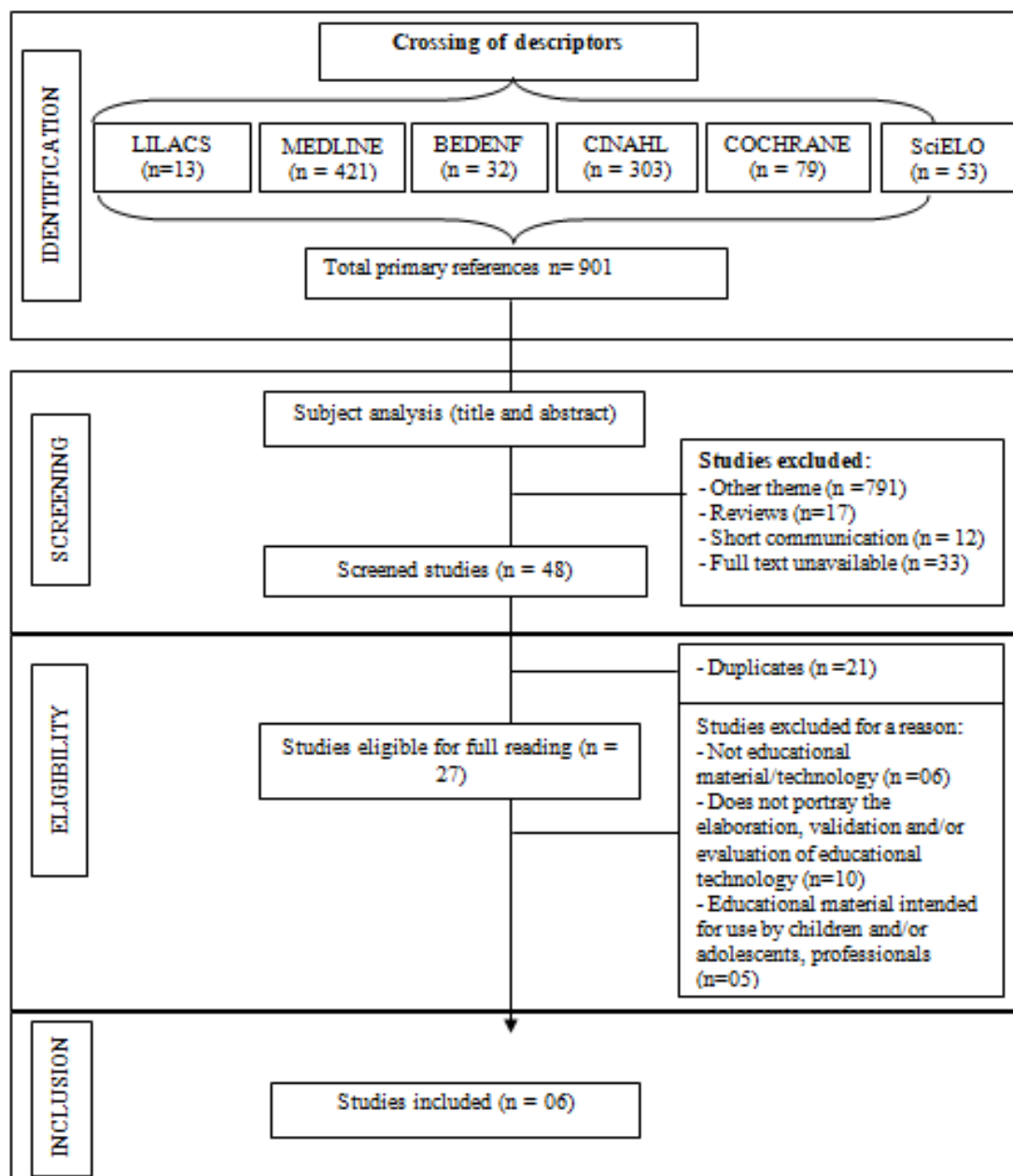


Figure 1. Process of selection of studies for the integrative review. Crato/CE (2021)

Source: Moher *et al.*⁽¹⁴⁾

RESULTS

In the process of searching the articles, 901 primary references were found. After screening the inclusion and exclusion criteria, 27 studies were selected for full reading. However, the final sample quantified six studies that answered the

research question, of these, four in English, located in the MEDLINE database; two in Portuguese, in the LILACS and CINAHAL databases. The identification and methodological characterization of the studies is detailed in the Box 2.

Box 2. Characterization of the studies included in the review. Crato/CE (2021)

Nº ID*	Authors (year)	Place	Types of study and Evidence Level (EL)*	Sample	Scenarios	Data collection techniques	Data analyses
1	Neto <i>et al.</i> (2017)	Brazil	Methodological (EL = 4)	22 experts 22 teachers	Municipal schools	Focus group	Content Validity Index, Scale-level Content Validity Index and binomial test
2	Sundeet <i>al.</i> (1998)	Norway	Applied research (EL = 4)	57 insurance company employees and 65 members of an air ambulance service	Norway Air Ambulance Service and Insurance Company Serviço de ambulância aérea e companhia de seguros da Noruega	Pre- and post-tests the calendar distribution	Grouped t-test for statistical analysis
3	Kumar <i>et al.</i> (2019)	India	Case-control randomized controlled (EL = 3B)	5-10 caregivers	Pediatric Neurology Out patient Clinic	Participant characterization form and first aid questionnaire	Mann Method and Wilcoxon Test
4	Al-Asfour <i>et al.</i> (2008)	Kuwait	Case control (EL = 3B)	150 parents	Primary school Escola primária	Questionnaires	Scoring by scores
5	Young <i>et al.</i> (2013)	China	Randomized controlled clinical trial (EL= 1B)	515 teachers	Primary and secondary schools	Questionnaires	Inferential statistical analysis by JPM Software, version 9.0.0, SAS Institute Inc., USA
6	Silva; Ferreira (2021)	Brazil	Methodological (EL = 4)	6 health professional, first aid teachers	Department of Health at a Public University	Questionnaire	Content Validity Index

Legend: ID Nº= Number of identification of the article, EL = Evidence level

Source: Own elaboration.

In view of the level of evidence of the studies, three studies with level of evidence 4 were found, whose results indicate a low degree of recommendation; two studies with level of evidence 3B, with a moderate degree of

recommendation; and an evidence level 1B study, with findings with a high degree of recommendation. The characterization of the selected studies regarding the applicability of the research question is shown in the Box 3.

Box 3. Characterization of the included studies regarding the applicability of the research question. Crato/CE (2021)

Nº ID*	Educational Technologies	Target Audience	Contexts (validation/evaluation)	Content covered
1	Booklet	Kindergarten and elementary school teachers I	Development and validation of educational technology designed for first aid with children from four to ten years old.	Bleeding, blows, osteo-locomotor injuries, seizures, heat injuries, amputations, burns, eye trauma, tooth avulsion, exogenous intoxication, accidents with poisonous animals, lowered level of consciousness, cardiorespiratory arrest, FBAO* and drowning.
2	Calendar	Lay public (parents, caregivers and others)	Elaboration of an annual child safety calendar for teaching first aid and evaluation of use with and without a dummy loan.	CPR* and FBAO.
3	Leaflet	Caregivers of children with seizures	Information leaflet and evaluation of the effectiveness of use, concomitant with a teaching program in first aid.	Care in seizures.
4	Leaflet	Parents	Leaflet designed for parents of students aged between 6 and 11 years for first aid measures, after tooth avulsion and evaluation of the effect.	Dental avulsion: general knowledge, reimplantation, cleaning, storage, and time outside the oral cavity.
5	Poster	Primary and secondary school teachers	Poster designed for teaching first aid and evaluating the effect, comparing two schools in Hong Kong.	Dental trauma emergencies: general knowledge, reimplantation and storage.
6	Comics on line	Parents/guardians of children and adolescents	Development and validation of technology designed for teaching first aid, through comic books with experts only.	Basic life support, drowning and FBAO*.

Legend: ID No. = Article identifier number, CPR = Cardiopulmonary resuscitation, FBAO = foreign-body airway obstruction

Source: Own elaboration.

DISCUSSION

Through the detailed analysis of the study sample, educational technologies of the type booklet⁽¹⁷⁾, calendar⁽¹⁸⁾, leaflets^(19,20), poster⁽²¹⁾ and comic books⁽²²⁾ were identified for use by parents and educators, which are discussed in sequence as to applicability in first aid.

The booklet has a benefit as a health education resource, as it strengthens knowledge, autonomy and care skills, through the information provided, and can also serve as educational material for ongoing training. The participatory construction of this resource allows the themes addressed to meet the population's needs^(23,24).

The limitations of this technology are related to the high cost of printing the material to be made available to the target population and the difficulty of using it, when it comes to the online form, by the population that does not have access to the internet⁽²⁴⁾.

On the other hand, the use of internet connection tools has been shown to be efficient for teaching, allowing for constant updates on various topics in the area of first aid for professionals and lay people, which can be accessed from anywhere, at a lower cost, when compared to print media technologies⁽²⁵⁾.

Regarding calendars, despite the bold design to alert the public, the mass distribution of these resources as teaching material has not been

effective, as it does not guarantee that the target population actually has access or interest in the material, and it can be discarded as any advertising material, the use of which should be associated with internal campaigns, when used within companies or by professionals who arouse interest in the practice of first aid⁽¹⁸⁾.

The use of leaflets allows the use of an attractive visual resource, with clear information and the possibility of informal language⁽²⁶⁾, showing itself as a valid strategy to help parents and caregivers with first aid care in both dental avulsion and seizures in identified studies^(19,20). As it is an educational technology designed to deal with a specific topic in a simple and direct way, the content covered must be basic and short⁽²⁶⁾. Therefore, the leaflet should be used as an aid and not the main mechanism for disseminating the information.

Like leaflets, posters also have direct language, stand out for their images and dynamic structure, they are considered the lowest-cost multimedia⁽²⁷⁾; however, a randomized clinical trial that evaluated the effectiveness of using posters as educational technology for teaching first aid identified turnover as a disadvantage, not remaining exposed for a long time, which reduces its effectiveness, as it may go unnoticed among the target audience⁽²¹⁾.

The teaching of first aid through comic books has been well accepted by professionals and by the lay community. Educational technology has narrative advantages illustrated in popular language, which can be used in print and online formats. Despite being a dynamic and interactive strategy, the use of more than one topic may require more than one narrative. It is important to highlight that the stories presented must approach the daily lives of the target audience. The validation study of the identified technology presented it as adequate for teaching first aid, however, it is limited by the non-validation with parents and guardians of children and adolescents⁽²²⁾.

From this perspective, it is noteworthy that the use of technologies, when associated with educational interventions, demonstrate a significant improvement in knowledge and attitudes towards accidents and common incidents in the home^(18,20) and school

environment. In addition, the participation of health professionals as agents in the construction and dissemination of health technologies is essential, so that they work towards improving the population's self-care and quality of life^(11,24,28).

There is a scarcity of studies that address the construction and validation of educational materials in first aid⁽¹⁷⁾, whose process requires the participation of expert judges and target population to qualify the resources used, information provided and affirm the use of these technologies in the practice of the day to day⁽²⁸⁾.

The themes in first aid addressed in the study sample^(17,19-21) corroborate studies that mention the main injuries in children in the home^(7,17,29) and school^(30,31) environment, emphasizing the importance of construction of materials that provide subsidies to this population for first aid care, preventing complications and health problems.

In view of the discussed findings, the authors' non-adoption for a time frame, seeking to immerse themselves in the theoretical field in this study, demonstrates a deficiency in educational technologies in first aid for parents and educators. It was found that the strength of the level of evidence of the studies found, according to the selected literature⁽¹⁵⁾, prevailed between low and moderate, which makes it difficult to use educational interventions supported by evidence-based health practice, making it necessary to carry out studies experimental and randomized clinical trials to assess the effectiveness of developed and validated technologies, so that they present a higher level of evidence and a better degree of recommendation.

Furthermore, among the technologies explained, the booklets proved to be more attractive due to their versatility for various contents in first aid, the use of dynamic resources and the possibility of using a digital version, reaching a broader target audience that demonstrates a preference for new technologies of teaching-learning.

CONCLUSION

The identified educational technologies are important strategies for teaching first aid, as they

seek to strengthen care skills and assist in the acquisition of new knowledge. However, there was a scarcity of studies with preparation and validation for educational technologies in first aid, aimed at the target audience investigated, especially with regard to digital technologies.

Thus, it is recommended to invest in educational technologies that are easy to access,

read and interpret, and also allow computerized resources, adapted to the population's common electronic devices, so that they can enhance the teaching-learning process about accidents and incidents that they are frequently experienced in the home and school environments, requiring validation by technical professionals and the target audience that one wishes to reach.

TECNOLOGIAS EDUCACIONAIS PARA O ENSINO DE PRIMEIROS SOCORROS A PAIS E EDUCADORES: REVISÃO INTEGRATIVA

RESUMO

Objetivo: Analisar as evidências científicas sobre estudos de elaboração e/ou validação de tecnologias educacionais para o ensino de primeiros socorros a pais e educadores. **Método:** Estudo de revisão integrativa, com questão de pesquisa elaborada pela estratégia PICo – População, Interesse, Contexto, selecionando-se os descritores “Parents”, “School Teachers”, “First Aids”, “Teaching Material”, “Educational Technology”, “Validation Study”. Realizou-se a busca em seis fontes de literatura científica, no período de junho de 2021. Aplicaram-se os critérios de inclusão e exclusão, em seguida, os dados foram extraídos por formulário próprio, avaliados por nível de evidência, analisados e interpretados pelo método de redução dos dados. **Resultados:** A amostra final quantificou seis estudos, com níveis de evidência científica baixo a moderado, que se destacam pela diversidade entre as tecnologias educacionais do tipo cartilha, calendário, folheto, pôster e história em quadrinhos para pais e educadores que tratam do ensino de primeiros socorros. **Conclusão:** Observou-se escassez de estudos de elaboração e validação de tecnologias educativas em primeiros socorros para pais e educadores. Recomenda-se investir em tecnologias educativas validadas de fácil acesso e leitura e, ainda, que permitam o uso em recursos informatizados, de modo a ampliar o acesso da população e abranger acidentes e incidentes vivenciados nos ambientes doméstico e escolar.

Palavras-chave: Tecnologia educacional. Primeiros socorros. Promoção da Saúde. Pais. Professores escolares.

TECNOLOGÍAS EDUCATIVAS PARA LA ENSEÑANZA DE PRIMEROS AUXILIOS A PADRES Y EDUCADORES: UNA REVISIÓN INTEGRADOR

RESUMEN

Objetivo: analizar las evidencias científicas sobre estudios de elaboración y/o validación de tecnologías educativas para la enseñanza de primeros auxilios a padres y educadores. **Método:** estudio de revisión integradora, con cuestión de investigación elaborada por la estrategia PICo - Población, Interés, Contexto, seleccionándose los descriptores “Parents”, “School Teachers”, “First Aids”, “Teaching Material”, “Educational Technology”, “Validation Study”. Se realizó la búsqueda en seis fuentes de literatura científica, en el período de junio de 2021. Se aplicaron los criterios de inclusión y exclusión, luego, los datos fueron extraídos por formulario propio, evaluados por nivel de evidencia, analizados e interpretados por el método de reducción de los datos. **Resultados:** la muestra final cuantificó seis estudios, con niveles de evidencia científica bajo a moderado, que se destacan por la diversidad entre las tecnologías educativas del tipo cartilla, calendario, folleto, póster y cómic dirigidos a padres y educadores que se ocupan de la enseñanza de primeros auxilios. **Conclusión:** se observó escasez de estudios de elaboración y validación de tecnologías educativas en primeros auxilios para padres y educadores. Se recomienda invertir en tecnologías educativas validadas de fácil acceso y lectura y, además, que permitan el uso de recursos informatizados, a fin de ampliar el acceso a la población e incluir accidentes e incidentes vividos en los ambientes doméstico y escolar.

Palabras clave: Tecnología educacional. Primeros auxilios. Promoción de la salud. Padres. Maestros.

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