Investigación en Enfermería
IMAGEN Y DESARROLLO

Vol. 25
Publicación continua
2023

ISSN: 2027-128X (En línea) | ISSN: 0124-2054 (Impreso)

Artículos

Comparison of Multimodal Strategies to Enhance Recognition of Child Development Milestones among Childcare Providers during a Virtual or In-person Conference*

Comparación de estrategias multimodales para mejorar el reconocimiento de los hitos del desarrollo infantil entre los proveedores de servicios de guardería durante una conferencia virtual o presencial

Comparação de estratégias multimodais para melhorar o reconhecimento de indicadores de desenvolvimento infantil entre o pessoal encargado do cuidado das crianças durante conferência virtual ou presencial

José Livia
Universidad Nacional Federico Villarreal, Perú
ORCID: https://orcid.org/0000-0003-2226-3349

Blanca Lidia Márquez Miramontes
Universidad Autónoma de Ciudad Juárez, México
ORCID: https://orcid.org/0000-0003-3466-9194

Rosalvina Campos Pérez
Universidad Nacional Federico Villarreal, Perú
ORCID: https://orcid.org/0000-0002-0765-2381

Marie Leiner de la Cabada [a]
Texas Tech University Health Sciences Center, El Paso, United States
marie.leiner@ttuhsc.edu
ORCID: *https://orcid.org/0000-0003-0831-3872*

DOI: https://doi.org/10.11144/Javeriana.ie25.cmse

Received: 08 february 2022
Accepted: 12 september 2022
Published: 15 february 2023

Abstract:

Introduction: Evaluations of knowledge obtained during conferences, whether in person or virtually, are rarely documented, in part because of the complexity of including an assessment, the pretesting involved, confidentiality concerns, and differences among attendees in terms of their education, language, and willingness to be evaluated. **Objective:** During a conference in the United States, we compared the recognition of developmental milestones using two different multimodal communication strategies (video vs. oral presentation) among three groups of childcare providers. **Methods:** Cross-sectional study with repeated measures. One hour before the conference completion, two groups (one virtual and one in-person) received an 8-minute multimodal presentation on child developmental milestones at 4 months (cartoon video); a control group, during the face-to-face conference, received an 8-minute multimedia presentation (oral via PowerPoint) on child developmental milestones at 4 months. The three groups responded twice to a scale to measure their recognition of developmental milestones before the lecture began and fifteen minutes before the end of the 2 ½ hours lecture. **Results:** Attendees, both in person and via the virtual modality, had significantly better recognition of developmental milestones at 4 months of age compared to the control group adjusted for age and education levels. **Conclusion:** These results suggest the advantages of a multimodal presentation using video versus an oral presentation during lectures to increase recognition of children's developmental milestones, which are complex and varied. Similarly, such a strategy may be effective regardless of the different characteristics related to the educational level or age of the set of participants attending a conference.
Keywords: communication, communication barriers, child development, health conferences, daycare providers, virtual.

Resumen:

Introducción: las evaluaciones de los conocimientos obtenidos durante conferencias, tanto en persona como de forma virtual, rara vez se documentan, en parte debido a la complejidad de incluir una evaluación, las pruebas previas que conlleva, las preocupaciones sobre la confidencialidad y las diferencias entre los asistentes en cuanto a su nivel educativo, lenguaje y disposición a ser evaluados. **Objetivo:** se comparó el reconocimiento de los indicadores del desarrollo infantil durante una conferencia en los Estados Unidos utilizando dos estrategias de comunicación multimodal diferentes (presentación de vídeo vs. presentación oral) entre tres grupos

Author notes

[a]Corresponding author. E-mail: marie.leiner@ttuhsc.edu

de personal a cargo del cuidado de los niños. **Métodos:** estudio transversal con medidas repetidas. Una hora antes de finalizar la conferencia, dos grupos (uno virtual y otro presencial) recibieron una presentación multimodal de 8 minutos sobre los indicadores del desarrollo infantil a los 4 meses (en vídeo con dibujos animados); un grupo de control, durante la conferencia presencial, recibió una presentación multimedia de 8 minutos (oral mediante PowerPoint) sobre los indicadores del desarrollo infantil a los 4 meses. **Resultados:** los tres grupos respondieron dos veces a una escala para medir el reconocimiento de los indicadores del desarrollo infantil antes de que empezara la conferencia y quince minutos antes de que terminara la conferencia de 2½ horas. Los asistentes, tanto en persona como a través de la modalidad virtual, tuvieron un reconocimiento signifi cativamente mayor de los indicadores del desarrollo infantil a los 4 meses de edad en comparación con el grupo de control, ajustado por edad y niveles de educación. **Conclusión:** estos resultados sugieren las ventajas de una presentación multimodal con vídeo en comparación con una presentación oral durante las conferencias para aumentar el reconocimiento de los indicadores del desarrollo infantil, que son complejos y variados. Asimismo, dicha estrategia puede ser eficaz independientemente de las diferentes características relacionadas con el nivel educativo o la edad del grupo de participantes que asisten a una conferencia.
Palabras clave: comunicación, barreras de comunicación, desarrollo infantil, conferencias de salud, personal de guarderías, virtual.

Resumo:

Introdução: as avaliações de conhecimentos obtidos durante conferências, tanto pessoalmente quanto de forma virtual, rara vez são documentadas, em parte, devido à complexidade de incluir uma avaliação, o pré-teste envolvido, questões de confi dencialidade e diferenças entre os participantes em termos de nível educacional, linguagem e vontade de ser avaliado. **Objetivo:** foi comparado o reconhecimento dos indicadores de desenvolvimento infantil durante uma conferencia nos Estados Unidos usando duas estratégias de comunicação multimodal diferentes (apresentação de vídeo versus apresentação oral) em três grupos de pessoal a cargo do cuidado de crianças. **Métodos:** estudo transversal com medidas repetidas. Uma hora antes de finalizar a conferência, dois grupos (um virtual e outro presencial) receberam apresentação multimodal de 8 minutos sobre os indicadores de desenvolvimento infantil aos 4 meses (em vídeo com quadrinhos animados); um grupo de controle, durante a conferencia presencial, recebeu uma apresentação multimídia de 8 minutos (oral mediante PowerPoint) sobre os indicadores de desenvolvimento infantil aos 4 meses. **Resultados:** os três grupos responderam duas vezes a uma escala para medir o reconhecimento dos indicadores de desenvolvimento infantil antes de começar a conferencia e quinze minutos antes de terminar a conferencia de 2½ horas. Os assistentes, tanto em pessoa quanto em modalidade virtual, tiveram um reconhecimento significativamente maior dos indicadores de desenvolvimento infantil a 4 meses de idade em comparação com o grupo de controle, ajustado por idade e níveis de educação. **Conclusão:** estes resultados sugerem as vantagens de uma apresentação multimodal com vídeo em comparação com uma apresentação oral durante as conferencias para aumentar o reconhecimento dos indicadores de desenvolvimento infantil, que são complexos e variados. Mesmo assim, tal estratégia pode ser eficaz independentemente das diferentes caraterísticas relacionadas com o nível educativo ou a idade do grupo de participantes que assistem a uma conferencia.
Palavras-chave: comunicação, barreiras de comunicação, desenvolvimento infantil, conferências de saúde, pessoal de creches, virtual.

Introduction

Learning that may (or may not) take place at conferences is rarely assessed. Most subjective evaluations are limited to individual appraisals of the knowledge sharing and learning that take place, as well as participant satisfaction regarding presentations or lectures (1). There are some reports describing evaluations of post-conference learning, such as evaluation of active learning and clinical reasoning among nurses (2), but in most cases, the learning that takes place at a conference is not assessed. Assessments of learning during a conference can be affected by the many potential differences between participants regarding factors such as education, language, and willingness to be assessed (3). In addition, the accuracy of an assessment may be undermined when participants feel uncomfortable answering questions about what they have learned or if they do not trust that the results will be confidential (4). External difficulties can also confound evaluations, since the knowledge acquired by a participant is directly dependent on the active attention provided during the lecture. A viewer's complete freedom in terms of whether or not to listen, takes notes, or even pay attention to the presentation can adversely affect the learning process and reflect in the assessment. Despite the above-mentioned difficulties in measuring how effectively participants learn at a conference, opportunities can

also be recognized, including the possibility of evaluating different educational strategies and their effect on audiences that are diverse in regard to culture, educational level, language, and literacy (5).

The logistics involved in evaluating learning at conferences are complicated, although the information obtained can be very useful in pinpointing beneficial changes in terms of the structuring of presentations or the topics covered. In fact, the knowledge benefits obtained through subjective evaluation generally outweigh those obtained through feedback on participant satisfaction (6). Given the current conditions in which the influx of education through remote platforms has increased due to COVID-19, it is important to consider it an important need to evaluate coherent, organized, and integrated activities used to achieve specific learning objectives. Evaluation of these presentations, whether exhibited in school, professional or public settings to teach/educate/review relevant or required topics, provides key aspects to determine their effectiveness and make necessary revisions and adjustments. The evaluation can determine whether the presentations meet the objectives and goals for which they were designed and intended, allowing the establishment of quantitative or qualitative indicators of structure, process, and outcome.

A model for measuring the impact of programs aimed at developing knowledge at conferences was developed by Kirkpatrick (2006), which establishes four levels of evaluation, including, for example, during the conference, *Reaction*, which measures the satisfaction of those receiving the training (i.e., the quality of the program, the facilitator's performance, the facilities, the support materials). It allows gathering information through satisfaction interviews, being able to establish whether the program has been positive, negative, or neutral. In addition, *Learning Oriented to Knowledge Acquisition*, which can be determined through participation in the conference, completion of exercises, results of the application of exams, and/or delivery of specific assignments. After the conference, the *Behavior* can be evaluated, with the application of the acquired knowledge in their work, which can be verified through observation, interviews with supervisors and subordinates, performance evaluation and evaluation of specific indicators. Finally, *Results*, which refers to the achievement of results at the level of economic, financial, quality, productive, social, environmental, or other indicators oriented to the target population of the program (7). In the study, we focused on evaluating the level of "Learning Oriented to Knowledge Acquisition", comparing the effect of two multimodal presentations and attendance either in person or virtually.

Developmental milestones relevance among parents and daycare providers

The organized sequence of developmental milestones that children orderly pass on their way to adulthood are used as typical behaviors to monitor possible delays. Normative developmental charts carefully describe the "typical" ages and stages at which "typically" developing children reach the major motor milestones. However, behind the simplicity of these ordered tables lies a reality that is much more complex and variable, even for "the typically developing child." Not only do the ages at which children achieve the different indicators of child development, or the age ranges of the normative milestones, vary, but the sequence of the indicators itself is also not mandatory and can vary considerably from one child to the next. Nevertheless, knowledge regarding normative developmental milestones is important for health professionals, parents, and childcare providers because it can help them detect and report possible delays in child development to their primary care physician (8).

Early detection of delays in child development can significantly affect the outcome. Parents play a fundamental role in the surveillance of a child's development and can provide essential information to primary care providers to facilitate early detection of developmental delays. Daycare staff can help parents detect possible developmental delays due to the considerable number of hours they spend with the children (9). Learning about child development milestones, even among specialists such as pediatricians or family practitioners, is complicated due to the broad scope of child development milestones and the complexity of

detection, so it is important to find strategies that facilitate recognition and understanding among caregivers of children at all educational levels to help parents detect possible developmental delays.

Multimodal strategies and modeling

Multimodal presentations such as television, movies, videos, or live social media presentations have been studied primarily for their social rather than cognitive effects (10-13). The influx of educational material presented using multimodal models in virtual or recorded presentations has increased in recent months although their potential effectiveness remains understudied. Most research available focuses on studying the effect of those presentations that involve behavioral models. Behavioral modeling (or role modeling) is based on social learning theory and states that a person can gather ideas, values, and facts by observing others and learning from those experiences (14). According to Professor Bandura creator of the social learning theory (15), most human behaviors are learned through observation and modeling; in other words, by observing others, one gets an idea of how new behaviors are performed, and that encoded information serves as a guide for present and future actions. Multimodal presentations that combine images, sound, voice, narratives, etc., whether live or through computer-generated productions, can produce similar effects even if the events do not occur in real life. Under this premise, viewers will learn from programs that use role modeling presented through television, films, or videotapes as if they were witnessing them.

An important consideration when evaluating the potential learning that exists in multimodal presentations is that viewer differences that affect learning such as age, gender, language, formal education, and literacy levels have a profound influence on viewer learning processes (16) and outcomes (17). For this reason, results relevant to evaluate the learning that occurs in multimodal presentations is relevant controlling variables that can modify this process such as the level of formal education or age.

In this study, we compared childcare providers' recall of information regarding developmental milestones at 4 months of age after from receiving an 8-minute multimodal or oral multimedia presentation either in-person or virtually. Two groups received the multimodal (in-person group) or virtual (virtual group) presentation and the control group received the oral multimedia presentation (control group).

Methods

Design and setting

The design includes a cross-sectional study with repeated measures analysis for the pre-post measurement of the dependent variable (recognition of developmental milestones at 4 months of age) as a result of the intervention that included a multimodal presentation (cartoon video) delivered in person, virtually or through a PowerPoint presentation during a conference.

Participants

All participants were childcare providers. Total in-person attendance included a total of 460 participants.

Group 1 (In-person 416 of 460 (90.4 %)) and Group 2 (Virtually 50 of 75 (66.67 %) - Daycare providers that attended the Developmental Milestones Conference in person or virtually and watched an 8-minute animated cartoon video about developmental milestones at 4 months of age one hour before the end of the conference.

Group 0 (Control) - Daycare providers that attended in-person the Developmental Milestones Conference and had an additional 8-minute oral presentation using PowerPoint about developmental milestones at 4 months of age.

Inclusion criteria

Caregivers of children participating in the lecture were invited to voluntarily join the study that would last about 15 minutes, in group 1 or group 0 after a break during the lecture. They were explained the reason for the study, that the answers were confidential and would not be linked to their name. They were informed that the study was independent of the conference and that their participation was voluntary and would not affect the issuance of a certificate for their attendance at the conference. Caregivers gave verbal consent to participate in the study and had time to ask questions.

Those in group 1 remained in the auditorium and those in group 0 moved to an adjoining room and were used as a control group.

Virtual group 2, through Zoom ~75 participants, were invited to participate only in the video group due to the logistics required to split them up.

A random sample of 50 of the total was selected as the equivalent for the control group.

The size of the control group was estimated to be a minimum of 50 participants because it was less than 10% of the attendees and because conference participants wished to view the video rather than the PowerPoint presentation.

Exclusion criteria

Participants who did not wish to participate in the study.

Intervention

The intervention took place during a 2 ½ hour conference in the United States in a metropolitan city, in the state of Texas, related to developmental milestones in children, including basic concepts, delays, referrals, safety measures, and the importance of follow-up with parents in detecting possible developmental delays. During the last hour of the conference during a break, an 8-minute video was presented to Group 1 and 2. The video was an animated cartoon of a family composed of a mother, father, and their 4-month-old baby. The entire production was narrated and described developmental skills and safety guidelines relevant to a 4-month-old child. The content was based on different recognized sources, research, and material from different organizations including pediatric medical societies, Bright Futures Guidelines, and the CDC's Developmental Milestones. The same information regarding development that occurs at 4 months of age was presented to the controls with an oral presentation using PowerPoint slides. All attendees had the same opportunity to learn about developmental milestones at different ages (including 4 months) during the conference prior to the video presentation reinforced during this conference break with a multimodal presentation.

Measures

Data collected prior to the animated cartoon video consisted of pre- and posttest knowledge assessments presented as multiple choice–format questions, with three options to select: "True", "Untrue", or "Unknown" (Table 1). Demographic information collected included gender, educational level, and age.

The questions were pilot tested by the authors prior to the study and focused on some of the developmental milestones at 4 months of age that could be more difficult to differentiate from general knowledge.

Questionnaires

The pre- and posttest questionnaires consisted of 13 multiple-choice questions, along with questions regarding the subject's gender, educational level, and age. Questions on the material presented in the video related to typical developmental skills of a 4-month-old child. Questions included in the questionnaire are shown in table 1.

TABLE 1
Questions included in the questionnaire for the typical development of a 4-month-old baby

	Questions	Responses		
	Most babies at 4 months can do the following	**True**	**False**	**Unknown**
1	Support their weight on their legs			
2	Roll over side to side			
3	Pull heavy things			
4	Eat cookies			
5	Stand up holding on to furniture			
6	Eat by themselves			
7	Say a few complete words			
8	Recognize their parents from other people			
9	Respond to their parents with smiles and little sounds			
10	Start crawling			
11	Reach objects and release them voluntarily			
12	Sit in a parent's lap in the car on short trips			
13	Play safely with small toys			

Source: own elaboration

Statistical analyses

All analyses were carried out using SPSS for Windows (SPSS 21.0, SPSS Inc., Chicago, IL). Descriptive and inferential statistical methods were employed. All testing was based on determining statistical significance at a two-sided alpha level of 0.05. The study sample was described using measures of central tendency (mean and median) and dispersion (standard deviation and range) for continuous variables and frequency and percentage for categorical variables. One-way analysis of variance (Anova) with repeated measures was used to compare the distribution of the change in score (post–pre) by group, age, education, and gender. During

attendance at the conference, the participants were informed of the objectives of the study and invited to participate on a voluntary basis. The study was reviewed and classified as exempt from IRB review by the TTUHSC El Paso Institutional Review Board.

Results

Of the 553 questionnaires initially distributed between the 3 groups, 37 (6.7 %) were excluded from the study because they were incomplete. Distribution in terms of gender, age, and education level are shown in Table 2 by group. The percentage of participants by groups did not differ by gender $\chi 2(1, n= 516) =0.59$, $p=0.589$, age grouped $\chi 2(2, n= 516) =7.61$, $p=0.107$ and education level $\chi 2(2, n= 516) =1.06$, $p=0.59$.

TABLE 2
Distribution of study participants by group, age, education, and gender

	In-person N (%)	Virtual N (%)	Control N (%)
Age in years			
18-22	53 (12.7)	9 (18.0)	13 (26.0)
23-37	160 (38.5)	21 (42.0)	16 (32.0)
> 37	203 (48.8)	20 (40.0)	21 (42.0)
Total	416 (100.0)	50 (100.0)	50 (100.0)
Education			
Up to High school	278 (66.8)	35 (70.0)	33 (66.0)
Technical	28 (6.7)	5 (10.0)	4 (8.0)
College	110 (26.4)	10 (20.0)	13 (26.4)
Total	416 (100.0)	50 (100.0)	50 (100.0)
Gender			
Female	395 (95.0)	49 (98.0)	3 (6.0)
Male	21 (5.0)	1 (2.0)	47 (94.0)
Total	416 (100.0)	50 (100.0)	50 (100.0)

Source: own elaboration

A one-way Anova was conducted to determine if the knowledge about developmental milestones at 4 months (pre-scores and post-scores) was different for groups' control, virtual or in-person. Differences between pre-scores between groups was not statistically significant, $F (2, 513) = 1.183$, $p = 0.307$. Post-scores attained were statistically significantly different for groups, Welch's $F (2, 513) = 103.31$, $p < 0.001$. Tukey post hoc analysis revealed that the mean increase in the post-scores from control to in-person group (2.134, 95 % CI [1.64, 2.63]) was statistically significant ($p <0.001$), as well as the increase from control to virtual group (2.26, 95 % CI [1.60, 2.92], $p < 0.001$), but no other group differences were statistically significant. Data is presented as mean ± standard deviation in table 3.

TABLE 3
Pre-post Test Distribution Scores among groups attending conference

Time of intervention	Group 1 (in-person) N =416 Mean score (SD)	Group 2 (virtual) N =50 Mean score (SD)	Group 0 (controls) N =50 Mean score (SD)	p value
Pre-intervention	8.83 (1.57)	9.16 (1.13)	8.92 (0.63)	0.31
Post-intervention	11.45 (1.51)	11.58 (0.76)	9.32 (0.98)	<0.001*

* Singnificant

Source: own elaboration

One-way Anova with repeated measures on the post-scores was conducted to detect potential changes in recall of information based on group, time (pre- and post-test), age and educational level. A significant group x time effect was found ($F = 10.07$; $p < 0.001$), but all other interactions were non-significant: group × age groups ($F = 2.333$; $p = 0.10$), time $^{\times}$ educational level ($F = 0.13$; $p = 0.882$).

Discussion

In this study, we compare the recognition of developmental milestones at 4 months of age, among daycare providers as a result of attending a conference and receiving one hour before the end of the conference a multimodal strategy adjusted by age and/or educational level.

The only statistical difference between the scores depended on participants being in the groups that received the multimodal intervention when compared to the control group. Those who watched the video (cases) had higher assessment scores than the controls, who did not watch the video.

Our study used a multimodal format to enhance learning that is widely recognized as an effective teaching tool (18). Its use has grown among healthcare professionals, particularly through online presentations (19), as a means of training clinicians (20-21). This approach appears to be particularly advantageous when the presentation includes complex material delivered to participants of different ages or levels of education. It is clear that media has an effect on youth, who have grown up in a world surrounded by electronic devices. Decades of study have demonstrated that media profoundly affects the lives and wellbeing of youth, with use linked to adverse effects regarding their physical, emotional, and spiritual health (22). Less research has been conducted on the potential positive effects of media and how it could be used to entertain while teaching and thus serve as a tool for communicating to both younger and older adults (23).

Since the advent of modern technology, including the digital explosion, the concept of literacy has undergone a process of perpetual transformation (24-26). While the traditional definition of literacy has been confined to the reading and writing of printed text, technology has transformed the notion of literacy into a multimodal entity involving a variety of communication formats, including visual, graphic, and musical (27-28). These complex and varied means of communication allow for creative compositions that can more effectively disseminate information by utilizing meaningful model and symbol systems intended to denote ideas, stories, or educational concepts. For example, visual images used in any form of communication among different generations are highly effective, because visuals are processed approximately 60,000 times faster in the brain than text. In addition, 40 % of people respond better to visual information than to plain text, and visual content boosts engagement (29).

Several studies have demonstrated the importance of the role of daycare providers and their contributions to children and their families (30-32). Considerable research conducted to date has focused on the effects of programs targeting these professionals on children's nutrition and weight control (33), but the potential benefits of such programs are much broader and include helping parents detect developmental delays by increasing their understanding of developmental concepts and informing parents.

This study has some limitations, including the fact that understanding the concepts presented at the conference does not necessarily mean that childcare providers would use that knowledge in their daily work. In addition, we did not assess the length of time that newly learned information would remain current in the participants' minds. The participants in the study lived in only one city, which suggests possible geographic bias. Most of the participants were interested in the developmental milestones, and consequently, although interest in the topic was high among participants, it could differ among childcare providers who were not at the conference. Despite these limitations, the results of our study highlight possibilities, such as enhanced learning by watching a multimodal presentation about complex material, that should be further explored. In addition, learning of the material was attained independently of language, level of education, or age. Finally, the learning was evaluated during a conference, which reveals interesting findings about the positive effects that a multimodal strategy has on the learning process.

Conclusion

It was observed in this study that multimodal video presentations when compared to an oral presentation appear to outperform the recognition of children's developmental milestones, which are complex and varied. Moreover, the learning displayed is particularly useful regardless of the education levels or age of participants attending a lecture.

Conflict of interest

The authors declare that they have no conflict of interest although the author Marie Leiner is the producer of the material that was used and distributed free of charge in day care centers before putting them on social media such as YouTube funded through projects for the benefit of childcare centers.

References

1. Cunningham EB, Wheeler A, Hajarizadeh B, French CE, Roche R, Marshall AD, et al. Interventions to enhance testing, linkage to care, and treatment initiation for hepatitis C virus infection: a systematic review and meta-analysis. Lancet Gastroenterol Hepatol. 2022;7(5):426-45. DOI:http://doi.org/10.1016/S2468-1253(21)00471-4

2. Megel ME, Nelson AE, Black J, Vogel J, Uphoff M. A comparison of student and faculty perceptions of clinical post-conference learning environment. Nurse Educ Today. 2013;33(5):525-9. DOI: http://doi.org/10.1016/j.nedt.2011.11.021

3. Sordahl J, King IC, Davis K, Tivis R, Smith SC, Fisher A, et al. Interprofessional case conference: impact on learner outcomes. Transl Behav Med. 2018;8(6):927-31. DOI: http://doi.org/10.1093/tbm/ibx018

4. Macdougall C, Epstein M, Highet L. Continuing professional development: putting the learner back at the centre. Arch Dis Child Educ Pract Ed. 2017;102(5):249-53. DOI: http://doi.org/10.1136/archdischild-2016-310864

5. Bower KM, Alexander KA, Levin MB, Jaques KA, Kub J. Using Critical Service-Learning Pedagogy to Prepare Graduate Nurses to Promote Health Equity. J Nurs Educ. 2021;60(1):38-43. DOI: http://doi.org/10.3928/01484834-20201217-09

6. de Vos MS, Hamming JF, Marang-van de Mheen PJ. Barriers and facilitators to learn and improve through morbidity and mortality conferences: a qualitative study. BMJ Open. 2017;7(11):e018833. DOI: http://doi.org/10.1136/bmjopen-2017-018833

7. Hidalgo-Parra Y, Hernández-Hechavarría Y, Leyva-Reyes N. Indicadores para evaluar el impacto de la capacitación en el trabajo. Ciencias Holguín. 2020;26(1):74-88.

8. Nevin JE, Witt DK. Well child and preventive care. Prim Care. 2002;29(3):543-55. DOI: http://doi.org/10.1016/s0095-4543(02)00004-0

9. Dai YG, Burke JD, Naigles L, Eigsti IM, Fein DA. Language Abilities in Monolingual- and Bilingual- Exposed Children with Autism or Other Developmental Disorders. Res Autism Spectr Disord. 2018;55:38-49. DOI: http://doi.org/10.1016/j.rasd.2018.08.001

10. Sedgwick-Muller JA, Muller-Sedgwick U, Adamou M, Catani M, Champ R, Gudjonsson G, et al. University students with attention deficit hyperactivity disorder (ADHD): a consensus statement from the UK Adult ADHD Network (UKAAN). BMC Psychiatry. 2022;22(1):292. DOI: http://doi.org/10.1186/s12888-022-03898-z

11. Goli A, Teymournia F, Naemabadi M, Garmaroodi AA. Architectural design game: A serious game approach to promote teaching and learning using multimodal interfaces. Educ Inf Technol (Dordr). 2022:1-32. DOI: http://doi.org/10.1007/s10639-022-11062-z

12. Blanie A, Shoaleh C, Marquion F, Benhamou D. Comparison of multimodal active learning and single-modality procedural simulation for central venous catheter insertion for incoming residents in anesthesiology: a prospective and randomized study. BMC Med Educ. 2022;22(1):357. DOI: http://doi.org/10.1186/s12909-022-03437-0

13. AlAbdulaali A, Asif A, Khatoon S, Alshamari M. Designing Multimodal Interactive Dashboard of Disaster Management Systems. Sensors (Basel). 2022;22(11). DOI: http://doi.org/10.3390/s22114292

14. Kao TA, Ling J, Dalaly M, Robbins LB, Cui Y. Parent-Child Dyad's Collective Family Efficacy and Risky Adolescent Health Behaviors. Nurs Res. 2020;69(6):455-65. DOI: http://doi.org/10.1097/NNR.0000000000000465

15. Bandura A. Social Learning Theory. New York: General Learning Press; 1977.

16. Engelbrecht MC, Kigozi NG, Heunis JC. Factors Associated with Limited Vaccine Literacy: Lessons Learnt from COVID-19. Vaccines (Basel). 2022;10(6). DOI: http://doi.org/10.3390/vaccines10060865

17. Lohr AM, Raygoza Tapia JP, Valdez ES, Hassett LC, Gubrium AC, Fiddian-Green A, et al. The use of digital stories as a health promotion intervention: a scoping review. BMC Public Health. 2022;22(1):1180. DOI: http://doi.org/10.1186/s12889-022-13595-x

18. Scholer SJ, Reich SM, Boshers RB, Bickman L. A multimedia violence prevention program increases pediatric residents' and childcare providers' knowledge about responding to childhood aggression. Clin Pediatr (Phila). 2005;44(5):413-7. DOI: http://doi.org/10.1177/000992280504400505

19. Davies S, Lorello GR, Downey K, Friedman Z. Effective learning environments - the process of creating and maintaining an online continuing education tool. Adv Med Educ Pract. 2017;8:447-52. DOI: http://doi.org/10.2147/AMEP.S136348

20. Singh T, Reyes-Portillo JA. Using Technology to Train Clinicians in Evidence-Based Treatment: A Systematic Review. Psychiatr Serv. 2020:appips201900186. DOI: http://doi.org/10.1176/appi.ps.201900186

21. Bateman MG, Iles TL, Quallich SG, Shaffer AW, Iaizzo PA. Multimodal functional and still imaging of a transplanted human heart reanimated using Visible Heart(R) methodologies. J Card Surg. 2020;35(3):668-71. DOI: http://doi.org/10.1111/jocs.14403

22. Araya B, Pena P, Leiner M. Developing a health education comic book: the advantages of learning the behaviours of a target audience. J Vis Commun Med. 2021;44(3):87-96. DOI: http://doi.org/10.1080/17453054.2021.1924639

23. Rosas-Blum ED, Granados HM, Mills BW, Leiner M. Comics as a Medium for Parent Health Education: Improving Understanding of Normal 9-Month-Old Developmental Milestones. Front Pediatr. 2018;6:203. DOI: http://doi.org/10.3389/fped.2018.00203

24. van Eikenhorst L, Taxis K, Rademakers J, Zullig LL, de Gier H, van Dijk L. How are medication related problems managed in primary care? An exploratory study in patients with diabetes and primary care providers. Res Social Adm Pharm. 2020;16(5):646-53. DOI: http://doi.org/10.1016/j.sapharm.2019.08.004

25. Edwards K, Rimes T, Smith R, Fernandez R, Stephenson L, Son J, et al. "Improving Access to Early Childhood Developmental Surveillance for Children from Culturally and Linguistically Diverse (CALD) Background". Int J Integr Care. 2020;20(2):3. DOI: http://doi.org/10.5334/ijic.4696

26. Poncette AS, Spies C, Mosch L, Schieler M, Weber-Carstens S, Krampe H, et al. Clinical Requirements of Future Patient Monitoring in the Intensive Care Unit: Qualitative Study. JMIR Med Inform. 2019;7(2):e13064. DOI: http://doi.org/10.2196/13064

27. Ntelioglou BY, Fannin J, Montanera M, Cummins J. A multilingual and multimodal approach to literacy teaching and learning in urban education: a collaborative inquiry project in an inner city elementary school. Front Psychol. 2014;5:533. DOI: http://doi.org/10.3389/fpsyg.2014.00533

28. Gregg N. Increasing access to learning for the adult basic education learner with learning disabilities: evidence-based accommodation research. J Learn Disabil. 2012;45(1):47-63. DOI: http://doi.org/10.1177/0022219411426855

29. Walter E, Gioglio J. The power of visual storytelling : how to use visuals, videos, and social media to market your brand. New York: McGraw-Hill; 2014. 221 p. DOI:http://doi.org/ http://doi.org/10.1036/9780071824002

30. Michel J, Ilg T, Neunhoeffer F, Hofbeck M, Heimberg E. Implementation and Evaluation of Resuscitation Training for Childcare Workers. Front Pediatr. 2022;10:824673. DOI: http://doi.org/10.3389/fped.2022.824673

31. Frost HM, Sebastian T, Keith A, Kurtz M, Dominguez SR, Parker SK, et al. COVID-19 and Acute Otitis Media in Children: A Case Series. J Prim Care Community Health. 2022;13:21501319221082351. DOI: http://doi.org/10.1177/21501319221082351

32. Luecking CT, Neshteruk CD, Mazzucca S, Ward DS. Efficacy of an Enhanced Implementation Strategy to Increase Parent Engagement with a Health Promotion Program in Childcare. Int J Environ Res Public Health. 2021;19(1). DOI: http://doi.org/10.3390/ijerph19010106

33. Lindsay AC, Salkeld JA, Greaney ML, Sands FD. Latino family childcare providers' beliefs, attitudes, and practices related to promotion of healthy behaviors among preschool children: a qualitative study. J Obes. 2015;2015:409742. DOI: http://doi.org/10.1155/2015/409742

Notes

***** Scientific research article

How to cite this article: Livia J, Márquez Miramontes BL, Campos Pérez R, Leiner de la Cabada M. Comparison of Multimodal Strategies to Enhance Recognition of Child Development Milestones among Childcare Providers during a Virtual or In-person Conference. Investig Enferm Imagen Desarr. 2023; 25. https://doi.org/10.11144/Javeriana.ie25.cmse