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Children's creativity through the STEAM approach at Buenavista parish

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Abstract

This research focuses on boosting children's creativity through art and technology using the STEAM method. It emphasizes the use of visual arts or painting, one of the oldest artistic mediums developed by humans. To make the arts more appealing, technological elements have been incorporated. The project aims to analyze the impact of visual arts and augmented reality through the STEAM approach on the creativity of children in Buenavista Parish. A qualitative methodology was used, including an observation sheet, templates for artistic development, and augmented reality tools such as QuiverVision. The observation results in this study reveal that the children in Buenavista exhibit a high level of curiosity and enthusiasm towards the use of pictorial and technological tools, demonstrating that combining visual arts with technology like augmented reality is an effective means of enhancing children's creativity.

Keywords: STEAM, visual arts, augmented reality.

Development

Introduction

Visual arts, highlighting painting and drawing, constitute a powerful means of fostering children's creativity, encouraging their personal expression and cognitive-emotional development. (Covarrubias Pérez, 2023). This work aims to analyze the impact of visual arts and augmented reality through the STEAM approach on the creativity of children in Buenavista Parish, focusing on how participation in pictorial activities can enhance individual expression, imagination, and non-verbal communication (Leon et al., 2022). As well as promoting the development of fine motor skills, visual perception, and problem-solving (San Miguel Prieto, 2023).

STEAM as a Approach for Fostering Children's Creativity

STEAM is a method currently used to stimulate creativity, critical thinking, and promote the use of innovation (Arguello Delgado et al., 2020); The branch of art allows individuals to express themselves creatively, stimulating their emotions (Casado Fernández & Checa Romero, 2020).

Visual Arts and Augmented Reality through the STEAM Approach

The STEAM methodology (Science, Technology, Engineering, Art, and Mathematics) is currently gaining traction at various levels of education (Matias et al., 2024); This study will focus on art and technology, with the proposal based on the integration of visual arts and Augmented Reality (AR) as a means to stimulate creativity and learning in children (Olabe et al., 2023).

Positive Aspects of Using Visual Arts with Children

The application of artistic activities in children offers a wide range of benefits. Painting and drawing encourage creativity and personal expression, which helps children in the development of their identity(Angeles & Moreno, 2020). These activities promote fine motor skills and coordination through the manipulation of brushes, crayons, colored pencils, ink, and other materials (Méndez Bejarano & Sarmiento Duarte, 2023). Visual arts also provide children with the opportunity to explore colors, shapes, and textures, which stimulates their visual perception and their ability to appreciate aesthetics (Orellana Luna, 2024).

Visual Arts as an Educational Tool for Children

Didactics is the area of pedagogy that focuses on the methods and techniques for teaching and learning. Its main objective is to design strategies and educational resources that facilitate the teaching process, maximizing students' learning. It mentions (Jiamin Jessica et al., 2024) That art continues to be the language of feelings, hope, and dreams; many people find in art a source of beauty, harmony, and self-discover (Fernández & Ruitiña, 2021). Becoming a conduit for innovation, meaning, and dimension in our lives and in society as a whole (Rodríguez Romero, 2022).

Methodology

In the development of the research, a qualitative research method was applied. A data collection instrument with categorical questions was constructed. For the application of the STEAM methodology integrated with visual arts and augmented reality, the following phases were used: (Santillán Aguirre et al., 2020):

Phase 1. Preparation of the Materials to be Used

It focused on the preparation of materials using both digital and traditional tools, with an emphasis on the application of Quiver 3D Vision for augmented reality using tablets. This combination of digital and traditional tools promotes a comprehensive and diverse creative experience(Arias Canseco, 2020).

Phase 2. Preparation of the Sketches

To proceed with the research activity, we prepared a sample sketch for the children, aiming to create an effective strategy to boost their creativity. By providing them with a visual starting point, children can explore, imagine, and interpret the visual information in the sketch in various ways, allowing them to develop their own ideas (Hofmann, 2021).

Phase 3. Training the Children

Activity 1: For carrying out this activity with the children from Buenavista, we began by organizing and presenting the tools and materials to be used. The children reacted enthusiastically upon seeing so many art materials together.

Activity 2: After immersing ourselves in the activity, we proceeded to use the Yuri the Painter template, where the children had to create a drawing based on their understanding of the sketch. They were required to create a mini-story about the character within the artwork.

Activity 3: After completing the narrative and pictorial creation activity, we moved on to the spatial geometry activity using the Hexahedron template. This allowed the children to plan and determine how they would paint each face of the cube while applying problem-solving skills, as some wrote inside the cube and others created simple yet eye-catching shapes.

Activity 4: After finishing the previous template, a 5-minute break was given for the children to have a moment to relax. We then continued with the activity using the Matakari template, where they had the freedom to create it however they wished and use any materials they preferred

Results

This section describes the main results obtained through the observation sheet. It presents a brief analysis of the collected data and the application of Spearman's correlational statistical analysis. For this study, a focus group of 45 children from Buenavista Parish was organized.

Tabla 1. Las ¿Qué tanto persiste el niño en la actividad a pesar de los desafíos artísticos?

			In my activities, I enjoy exploring and discovering new ideas and ways of doing things	I feel comfortable working on projects that combine science, technology, engineering, art, and mathematics (STEAM)	I enjoy solving problems using my creativity and critical thinking.	I enjoy working as a team to create something new or solve a STEAM challenge.	I believe that STEAM activities help me learn in a fun and exciting way.
Rho de Spearman	Question 1	Correlation coefficient	1,000	1,000**	-,539**	,774**	,539**
		Sig. (bilateral)	.	.	,000	,000	,000
		N	45	45	45	45	45
	Question 2	Correlation coefficient	1,000**	1,000	-,539**	,774**	,539**
		Sig. (bilateral)	.	.	,000	,000	,000
		N	45	45	45	45	45
	Question 3	Correlation coefficient	-,539**	-,539**	1,000	-,236	-1,000**
		Sig. (bilateral)	,000	,000	.	,119	.
		N	45	45	45	45	45
	Question 4	Correlation coefficient	,774**	,774**	-,236	1,000	,236
		Sig. (bilateral)	,000	,000	,119	.	,119
		N	45	45	45	45	45
	Question 5	Correlation coefficient	,539**	,539**	-1,000**	,236	1,000
		Sig. (bilateral)	,000	,000	.	,119	.
		N	45	45	45	45	45

**. The correlation is significant at the 0.01 level (two-tailed)

Regarding question 2, the perfect correlation indicates that all participants who enjoy exploring new ideas also feel comfortable working on STEAM projects. Since the significance is $p < 0.01$, this correlation is statistically significant. However, in question 3, this negative correlation suggests a moderate inverse relationship: as someone enjoys exploring new ideas, they tend to enjoy solving problems creatively less. The significance of $p < 0.01$ indicates that this inverse relationship is statistically significant, although not extremely strong. Conversely, in question 4, it indicates a strong correlation,

and a significant positive relationship can be observed: those who enjoy exploring new ideas also tend to enjoy working as a team on STEAM challenges. The significance of $p < 0.01$ confirms that this relationship is consistent and significant in the sample. It is important to note that in question 5, the positive correlation indicates that those who enjoy exploring new ideas also tend to see STEAM activities as fun and exciting, with a significance of $p < 0.01$, demonstrating the statistical relevance of this relationship.

There is a weak positive correlation (0.236) between 'I enjoy working as a team to create something new or solve a STEAM challenge' and 'I believe that STEAM activities help me learn in a fun and exciting way,' where ($p > 0.05$) indicates that there is no strong relationship between enjoying teamwork and viewing STEAM activities as a fun and exciting way to learn. However, there is a moderate positive correlation (0.539) between 'I feel comfortable working on STEAM projects' and 'I believe that STEAM activities help me learn in a fun and exciting way': this means that those who feel comfortable with STEAM projects also tend to view them as a fun and exciting way to learn, with a significance of $p < 0.01$, reinforcing the statistical relevance.

Discussion

Among the findings of the study, it is noted that children exhibit a high level of originality during artistic activities. Portillo Ríos (2023) reports high levels of ability to think and create differently in groups that have experimented with technological artistic activities. According to Bernaschina (2023), experiencing new painting techniques fosters the development of unique thinking in children. Implementing artistic activities increases the level of originality in children as it allows them to explore new ideas

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Regarding the level of creativity of the child during the development of the activity, a high level of creativity and artistic development is maintained. This data aligns with Rodríguez (2022), who mentions that imagination is enhanced by using different pictorial materials. Rincón Caballero (2023) indicates that creativity is deeply associated with art as a skill for all artistic production.

Based on the results obtained, it was shown that children exhibit a high level of enthusiasm and curiosity when using pictorial and technological tools, with some children showing very high levels of engagement with these resources. Husted Ramos (2023) mentions in their analysis that their study group agrees that augmented reality is very versatile as an attractive and motivating technological resource for children. Soto Solier (2024) reiterates that the use of augmented reality enhances children's cognitive processes, thereby stimulating curiosity in their learning processes. It is possible to confirm that using pictorial tools with technologies like augmented reality increases children's level of curiosity

Conclusion

Visual arts as a means to boost creativity in children have proven to be a positive factor. By participating in various activities, children have the opportunity to explore their imagination and express themselves uniquely. The findings underscore the importance of considering multiple dimensions in

STEAM activities, as well as perceptions of how these activities contribute to learning and personal development.

The study implemented artistic activities mediated by technology. In response to these stimuli, the children from Buenavista Parish were enthusiastic and willing to collaborate, engaging in painting and drawing tasks with AR technology. It was evident that not only was their creativity stimulated, but they were also open to experimenting with new forms of artistic expression.

One of the limitations

- Small sample size (N=45), which could limit the generalization of the results. Future research should involve a larger population to gain a broader perspective on the data.
- Future research
- Applying this study with larger samples will allow for the verification of the results found, thus providing greater robustness to the conclusions
- Exploring multiple contexts, including various cultural, socioeconomic, and educational environments, is crucial for understanding how these factors influence attitudes towards STEAM activities.

Referencias

Angeles, D., & Moreno, L. (2020). El Arte en un acto sensible: El niño en procesos creativos. Revista de Arte y Manualidades, 1(1), Article 1.

Arguello Delgado, V., Chaparro Calderón, M. A., & García Hernández, L. N. (2020). Steam Creative. https://repository.unab.edu.co/handle/20.500.12749/7251

Arias Canseco, J. Á. (2020). Programación de una aplicación Android para la visualización de modelos 3D en realidad aumentada. https://uvadoc.uva.es/handle/10324/40513

Bernaschina, D. (2023). Artes mediales e inteligencia artificial: La crisis de la ética y la precariedad laboral en el campo artístico-digital. Revista Avenir, 7(1), Article 1.

Casado Fernández, R., & Checa Romero, M. (2020). Robótica y proyectos STEAM: Desarrollo de la creatividad en las aulas de Educación Primaria. Pixel-Bit. https://doi.org/10.12795/pixelbit.73672

Covarrubias Pérez, R. (2023). STEAM en Educación Primaria: Un enfoque interdisciplinario para la innovación educativa. https://uvadoc.uva.es/handle/10324/66035

Fernández, A. M. B., & Ruitiña, M. J. R. (2021). Didactic strategies based on research in undergraduate studies: Conservation and restoration of pictorial heritage on cement supports. Ge-Conservacion, 20, 246-260. https://doi.org/10.37558/GEC.V20I1.1072

Hofmann, A. (2021). Dibujo-Observación-Voz. La discusión de una propuesta metodológica para investigaciones etnográficas centradas en niños y niñas. INDIANA, 185-216 Páginas. https://doi.org/10.18441/IND.V38I1.185-216

Husted Ramos, S. (2023). «Realidad Aumentada, Más allá de la historia»: Un proyecto de aprendizaje STEAM y ABP para mejorar Competencias Transversales [Capítulo de libro]. Dikinson, S. L. https://cathi.uacj.mx/handle/20.500.11961/26665

Jiamin Jessica, G., Laura María, A. S., & Manuel Antonio, F. vargas. (2024). Caos ante el abismo: Una experiencia inmersiva basada en las obras pictóricas de Julio Escámez. https://repositorio.una.ac.cr/handle/11056/27864

Leon, C., Lipuma, J., Morales-Carbajal, R., Bastarrachea-Magnani, M. A., & Arriaga, A. (2022). Journal of Roleplaying Studies and STEAM (JRPSSTEAM) Vol. 1 [2022], Issue 1. 1(1).

Matias, J., Cruz, S., Riofrio, O., & Pinto, Y. (2024). APPLICATION OF IMMERSIVE TOOLS WITH A STEAM APPROACH IN TEACHER TRAINING IN HIGHER EDUCATION. INTED2024 Proceedings, 62736283. 18th International Technology, Education and Development Conference. https://doi.org/10.21125/inted.2024.1651

Méndez Bejarano, I. C., & Sarmiento Duarte, Á. P. (2023). Artes plásticas como medio de fortalecimiento de la motricidad fina en estudiantes de Jardín IED Nuevo Chile. http://hdl.handle.net/11371/6373

Moreno Fuentes, E., Hidalgo Navarrete, J., Burgos Bolós, C., & Blanca de la Paz, S. de la. (2021). Aprendizaje integrado y colaborativo de ciencias a través de las realidad aumentada en educación infantil. Etic@net: Revista científica electrónica de Educación y Comunicación en la Sociedad del Conocimiento, 21(1), 214-229.

Olabe, J. C. M., Vivanco, E. D. M., Romero, E. O. R., & Sanchez, G. M. L. (2023). Realidad Aumentada para Fortalecer el Aprendizaje en la Asignatura de Ciencias Naturales. Ciencia Latina Revista Científica Multidisciplinar, 7(5), 7884-7909. https://doi.org/10.37811/cl_rcm.v7i5.8371

Orellana Luna, P. (2024). Apreciación estética musical y de artes visuales: Su relación con la comunicación afectiva en niños/as de Educación Inicial. Tercio creciente, 25, 177-205.

Portillo Ríos, R. A. (2023). Diseño instruccional ADDIE para el uso de la realidad aumentada en ejercicios colaborativos interdisciplinarios. Revista de Artes y Humanidades UNICA, 24(Especial), Article Especial. https://doi.org/10.5281/zenodo.11540173

Rincón Caballero, D. A. (2023). Diseño especulativo: Entre ciencia y arte a través de las ficciones y la patafísica. Cuadernos del Centro de Estudios en Diseño y Comunicación. Ensayos, 179, 185-200.

Rodríguez, A. S. (2022). Arte, emoción y cognición corporeizada: Creando experiencias perceptivas a través de prácticas artísticas docentes. Encuentros. Revista de Ciencias Humanas, Teoría Social y Pensamiento Crítico., 15, Article 15. https://doi.org/10.5281/zenodo.5979946

Rodríguez Romero, A. (2022). Las obras de Pablo Picasso como recurso didáctico en las aulas de Educación Primaria. https://uva-doc.uva.es/handle/10324/58883

San Miguel Prieto, S. (2023). IMPLEMENTACIÓN DE LA METODOLOGÍA STEAM Y ABI EN EL ÁREA DE MÚSICA. https://eciencia.urjc.es/handle/10115/25442

Santillán Aguirre, J. P., Jaramillo Moyano, E. M., Santos Poveda, R. D., & Cadena Vaca, V. D. C. (2020). STEAM como metodología activa de aprendizaje en la educación superior. Polo del Conocimiento: Revista científico - profesional, 5(8 (AGOSTO 2020)), 467-492.

Soto Solier, P. M. (2024). Arte-Educación-Tecnología. Proyectos artísticos, educación STEAM y pensamiento creativo para el desarrollo sostenible y la transformación social y personal. https://digibug.ugr.es/handle/10481/92102