RESEARCH ON STEAM EDUCATION

Πανεπιστήμιο Κρήτης
University of Crete

QUALIFIED GENERATIONS WITH STEAM EDUCATION
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THEORETICAL FRAMEWORK

STEAM represents an evolution from the concept of STEM in that the inclusion of the arts is centered around stoking or bolstering the “imagination through innovation” of students as they approach STEM-related issues (Feldman, 2015; Burrows et al., 2018)

A STEAM-centric curriculum offers an opportunity to inject creativity into courses that have traditionally been more scientific in nature (Jolly, 2014).

The notion of STEAM (science, technology, engineering, arts, and mathematics) is an emerging discipline unique in its desire to provide a well-rounded approach to education (Rolling, 2016).

- This approach aims to break down the barriers between scientific disciplines and the arts, fostering a more holistic educational experience.

- By integrating artistic elements into STEM subjects, STEAM encourages students to think creatively and develop innovative solutions to complex problems, preparing them for the challenges of the 21st century.

- Recently, the academic community has begun to show interest in encouraging and closely articulating the humanities with the sciences and technologies, as one of the keys to human development (Katz-Buonincontro, 2018).

Preparing for Global Challenges

STEAM education equips students with the skills to tackle complex global issues by integrating scientific knowledge with artistic creativity.

Fostering Creativity

By blending arts with STEM, STEAM promotes innovative thinking, encouraging students to explore unconventional solutions to problems.

Enhancing Critical Thinking

STEAM education emphasizes inquiry-based learning, fostering critical thinking skills essential for informed decision-making in a rapidly changing world.

Encouraging Collaborative Learning

Through group projects and interdisciplinary approaches, STEAM encourages collaboration, preparing students for teamwork in diverse environments.

Integration of Disciplines

- STEAM education combines science, technology, engineering, arts, and mathematics to create a holistic learning experience, allowing students to approach problems from multiple perspectives.

Interdisciplinary Learning

- This approach encourages students to make connections between different subjects, fostering a deeper understanding of each discipline through collaborative projects.

Transdisciplinary Focus

- Transdisciplinary learning transcends traditional subject boundaries, enabling students to engage in real-world problem-solving that requires knowledge and skills from various fields.

LITERATURE REVIEW

Most teachers perceive the positive contribution of STEAM to the educational process and try to incorporate it into practice (Giavrimis et al., 2010).

Although they sometimes seem insecure and do not feel effective in their work when they have to plan and implement lessons in which new technologies are involved (Bers & Postmore, 2005) they express however a positive attitude towards STEAM teaching, and they seem to understand their role in successfully implementing this new educational practice in the classroom.

Although they experience pressure with the increased workload (Papagianopoulou, 2022), teachers recognize the positive effects of robotics for exemple to all of their students and consider utilizing the possibilities of STEAM in greater depth as a useful tool (Kappou, 2020).

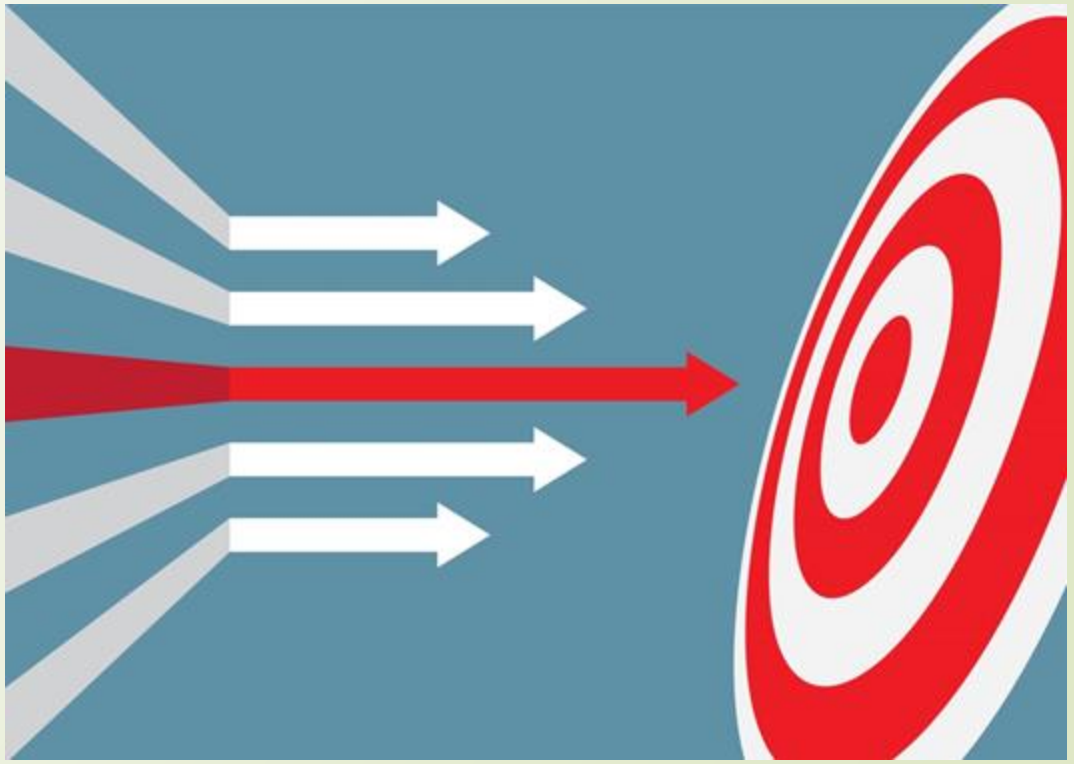
THE RESEARCH

The purpose of this study is to determine the opinions of students about STEAM activities. The perceptions of students about STEM activities are crucial because if we evaluate the design, content and the scope of these activities, we will be able to improve these fields (Baran et al., 2016). If we determine the opinions of students about these activities, it is believed that we can prepare activities which can contribute a lot to the students about STEAM education

THE RESEARCH QUESTIONS

- PRE-ACTIVITIES QUESTIONNAIRE
- POST ACTIVITIES QUESTIONNAIRE

THE TARGET GROUP



THE METHOD

Questionnaires are typically perceived to be a less complex data collection technique when compared to interviews, focus groups or ethnographic observations, placing considerably less pressure on participants and time to think and express themselves. The standardized nature of questionnaire design is also considered advantageous for the qualitative researcher. Participants are asked the same questions, in the same way and order, and the data generated facilitates comparability and ease of analysis while thematic saturation is reached (Braun & Clarke, 2013). Then the content analysis of the questionnaires was carried out by extracting codes, which were subsequently coded, counted and, where appropriate, grouped.

THE RESULTS

STUDENTS PERCEPTIONS

Research Findings

Student Perceptions of STEAM

15/25

Students finding lessons relevant

19/25

Students interested in science

100%

Students wishing for more STEAM activities

14/18

Students valuing peer collaboration

Results

STEAM Activity Outcomes

Increased Engagement

Students reported a 70% increase in engagement during STEAM activities, finding hands-on learning more stimulating than traditional lectures.

Enhanced Problem-Solving Skills

Post-activity assessments showed a 60% improvement in students' problem-solving abilities, as they tackled real-world challenges through interdisciplinary projects.

Boosted Creativity

Feedback indicated that 75% of students felt their creativity flourished during STEAM projects, particularly when integrating artistic approaches with scientific concepts.

Improved Collaboration

Collaboration improved with students working in teams, with 80% stating they valued peer interactions and shared knowledge during STEAM tasks.

Higher Retention Rates

Research revealed that students participating in STEAM activities retained 50% more information compared to traditional learning methods.

Career Readiness

Students expressed increased confidence in their future careers, with 65% stating that STEAM activities prepared them better for STEM jobs.

TESTIMONIALS

St 12: "I want to learn more".

St 6: "I would like to discover more real-life practices"

St 14: "Steam projects make us pass through challenges that allow us to learn how to solve them".

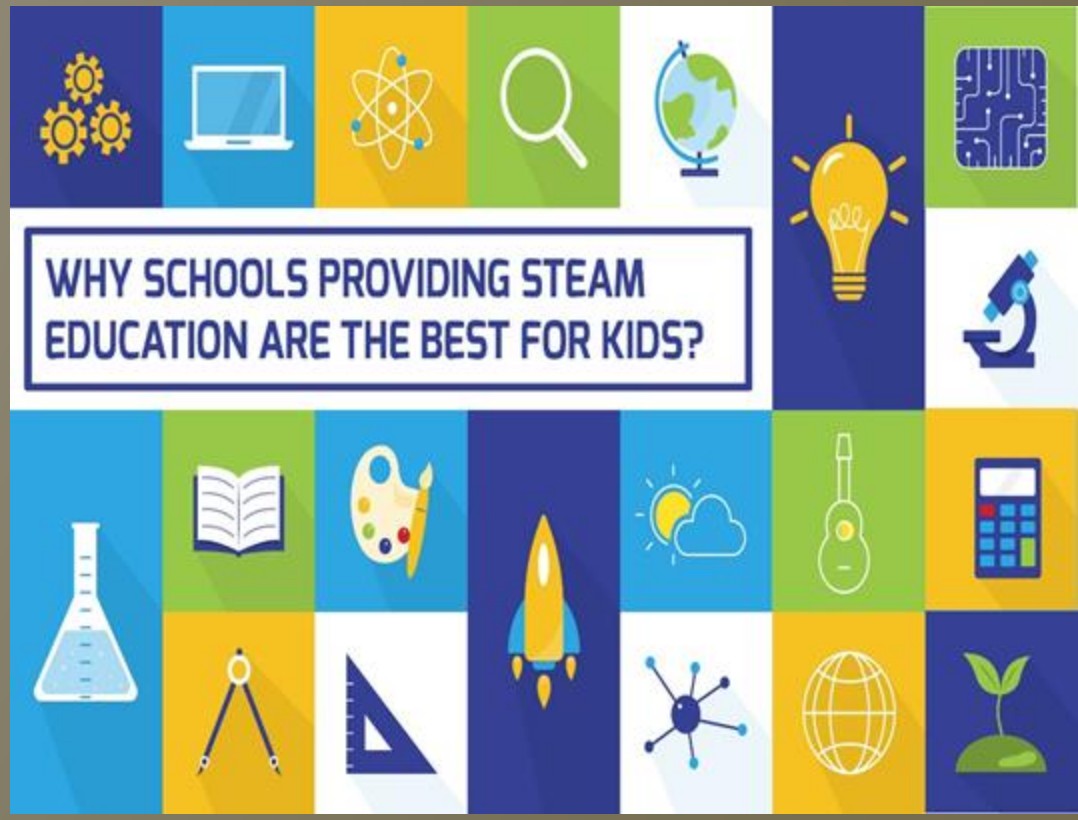
St 8 : " I learned a lot with my peers and how to use technology"

St23" "I use my knowledge of mathematics and coding in a better way".

St 6: "I have learned to be more open and talkative".

TESTIMONIALS

St 4: “I met new people and became more open to others. I am not afraid to meet new people, work with them and travel alone anymore.”



CONCLUSION

Implementing STEAM education enhances students' creativity, critical thinking, and problem-solving skills, preparing them for real-world challenges. It fosters interdisciplinary learning, making education more relevant to contemporary issues. However, challenges include the need for teacher training and resources to effectively integrate arts into STEM curricula. The potential impact on future education and employment is significant, as STEAM graduates are equipped with the skills necessary to thrive in a rapidly evolving job market.

THANK YOU!