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PROCEEDINGS: 2025 CONNECTED LEARNING SUMMIT

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FROM THE EDITORS

Welcome to the *Proceedings of the 7th biennial Connected Learning Summit*. Hosted October 5–10, 2025, the summit brought together more than 512 scholars, practitioners, and innovators across ed tech, public media, local governments, and higher education to think collectively about how best to adapt the tenets of connected learning to meet the needs of learners in the current moment. In the midst of unprecedented cuts to research funding in the United States, the rise of AI, increasing global discord, and the spread of misinformation, the work of the connected learning community remains as urgent as ever. Holding a light up to the tensions, contradictions, and possibilities of emerging technologies, the work coming out of this year’s summit continued to affirm the importance of tuning into and supporting the ingenuity of youth, reminding us that opportunities for participatory, playful, and creative learning can (and must) ignite the social dreaming and innovation necessary for forging more humanizing, dignified futures.

This year, the summit followed a hybrid format, allowing both the rich opportunity to connect in person and the increased accessibility of the virtual space. The online program included talks, workshops, and meetups, while hosts worldwide organized in-person events, including keynotes and panels that were streamed online, as well as poster sessions, receptions, and viewing parties. In total, the 512 people in attendance represented over 14 countries, a testament to the importance of our work, as well as the resolve and innovation of scholars in the face of funding and intellectual attacks. Host Institutions included MIT, NYU, UC Berkeley, UC Irvine, Utah State University, University of Sydney, and Institut Teknologi Bandung, with a robust program of in-person keynote speakers. Overall, the powerful work of Meryl Alper, Danaé Metaxa, and Vanessa Angélica Villarreal captured valuable insights about how youths’ speculative practices, neurodivergence, and engagements with AI literacies might catalyze new understandings of connection in ways that remedy educational inequities that have long persisted.

FROM THE EDITORS

This proceedings features 19 research papers that were presented at the 2025 summit after peer review. We are grateful for the contributions of these 71 authors, who challenge us to think about the nuanced implications of emerging technologies in school, after-school, and home settings across K–12 and postsecondary settings. More broadly, these 71 authors also demonstrate an exceptional and inspiring level of collaboration across academic credentials, expertise, and industries within the current academic, educational, and funding landscape.

We are also grateful to the Connected Learning Alliance’s Elissa Alves for copy editing, proofreading, and formatting, Cindy Hau for cover design, technical support from Victor Lazo, and Drew Davidson and the team at Play Story Press.

The Connected Learning Summit will convene again in fall 2027 with event details to come. We look forward to continuing to learn together across our many contexts.

On behalf of the proceedings team,

Bryce Becker & Danielle Filipiak

Co-Editors, *Proceedings of the 2025 Connected Learning Summit*

FOURTEEN

CREATIVITY WITHOUT BORDERS

AN IMPACT STUDY OF UNSTRUCTURED STUDIO'S
LOW-COST TINKERING APPROACH IN RURAL INDIA

SRISHTI SETHI & SUCHAKRA SHARMA

Abstract: Learning models centered on hands-on making, creativity, and play have been widely adopted over the last decade, driven by the Maker, open-source, and DIY movements. Despite this, rural environments, especially in the developing world, still lack sustainable frameworks to foster creativity among children. In such settings, creativity often takes a backseat as institutions face more urgent problems, including dropout rates and lower literacy and numeracy skills. Because creativity is difficult to link directly to academic achievement and foundational learning outcomes, educators and parents often question its relevance and how it benefits children's learning and future employment. This study explores how low-cost tools, activities, and resources can support creative learning for children in rural India. Using a structured creativity assessment framework, the study engaged 30 students in grades 4 to 8 in a year-long program run by Unstructured Studio, a nonprofit organization focused on creative education. The findings show a notable increase in students' confidence, idea generation, peer collaboration, and critical thinking skills.

INTRODUCTION

Numerous theories emphasize the learning potential of creating and tinkering in academic contexts, as well as their role in supporting children's holistic development and nurturing essential skills for the modern world (Peppler et al., 2016; Resnick, 2017; Vygotsky, 1978). Despite policy-level recognition and efforts to integrate creativity, experiential learning, and play-based education into traditional frameworks (Government of India, 2020), rural India still lacks meaningful implementation. Disparities in learning resources and infrastructure for socioeconomically disadvantaged groups (SEDGs) highlight the need for more project-based and collaborative learning opportunities to ensure equitable access to higher education (NIEPA, 2021). In rural settings, dropout rates remain high due to a heavy emphasis on rote memoriza-

tion and limited resources for creative pedagogies (Singh & Mukherjee, 2017). Children in such contexts need low-cost, contextual, and sustainable creative learning opportunities that equip them with the skills and confidence to thrive in the growing creator economy, which was valued at approximately \$250 billion in 2023 and is expected to nearly double to \$480 billion by 2027 (Goldman Sachs, 2023). While creative learning frameworks are gaining momentum, low-cost and sustainable initiatives remain limited, with only a few studies demonstrating their impact on student outcomes.

This study addresses two research questions:

RQ1: How do low-cost creative learning experiences contribute to student development in rural environments?

RQ2: How do these experiences strengthen the 4C skills (creativity, critical thinking, communication, and collaboration), and how can these developments be measured?

RELATED WORK

Agastya's Mobile Science Labs are portable labs set up in buses to engage children in hands-on, experiential learning around scientific concepts. Studies report that students gain insights into the relevance of science in their daily lives. Similar to ATL, Agastya faces sustainability challenges related to deployment, infrastructure, and engagement, as scaling science labs to multiple areas involves significant costs, requires regular maintenance, and presents difficulties for educators in traveling to remote locations (Patel et al., 2024). At the grassroots level, Arvind Gupta's model of making toys from trash (Gupta, n.d.) is a strong example of learning through low-cost, everyday activities. However, there is a lack of documentation on its long-term impact on student learning.

These examples show both the potential and limitations of creative learning models in under-resourced areas. This is where Unstructured Studio's work, focused on a low-cost creative framework designed to be scalable and sustainable, builds upon findings from existing frameworks. However, measuring creativity remains a complex and underdeveloped area of research. As there are few case studies demonstrating the impact of creativity on children's learning outcomes, both in the short and long term, this study aims to contribute to the field by exploring how creativity can be measured and examining the impact of Unstructured Studio's model on student learning outcomes.

METHODS

The study used a mixed-methods design to explore children's experiences with creative activities and learning outcomes through interviews. The interviews were later analyzed to document students' outcomes in both quantitative and qualitative formats, organized around the 4C skills themes: creativity, critical thinking, communication, and collaboration.

Participants

Thirty students from grades 4 to 8 participated in a year-long learning program and research study, completing one activity each month. Both the program and the research were conducted in a hybrid format, where the primary facilitators joined virtually via video conferencing tools, and children were present in person, supported by secondary facilitators. These facilitators were from the Amba Ujjwal Foundation, a nonprofit that runs an after-school program in Delhi for children from low-income families, focusing on STEM skill development. The program supports children whose mothers are involved in the organization's empowerment initiatives. These children come from families where parents typically work as daily wage laborers, construction workers, or domestic helpers. Limited financial resources and low literacy levels among parents often hinder the educational development of these children. As a result, many face barriers to consistent formal education and vocational training, and high school dropout rates among older students further reduce their future employment opportunities.

Activities

Activities were drawn from Unstructured Studio's repository of low-cost creative learning activities. These playful, culturally relevant STEAM activities were adapted for under-resourced learning environments. They encourage open-ended exploration at the intersection of culture, science, and creativity, using low-cost, readily available, and easy-to-procure materials found at home or in the local environment. The ultimate goal is to nurture the 4C skills in children and deepen their connection to their surroundings, the real world, and themselves, while also exposing them to future higher education opportunities. These activities exemplify the idea of "high ceilings, wide walls, and low floors" (Resnick, 2020) by showcasing inspiring examples of local artists who have developed out-of-the-box, highly creative projects using similar STEAM principles and concepts with real-world relevance.

In these settings, the activities are often adapted to be as low-cost as possible. For instance, if no light source is available, children are encouraged to use a mobile phone torch; if paper circuits are unavailable, they substitute aluminum foil; and when expensive decorative materials are not accessible, they use natural elements such as fallen leaves, twigs, and flowers. During these workshops, students developed creative projects, including interactive design mazes, a messaging station built using homemade circuits based on Morse code principles, and a skateboard launch ramp utilizing the principles of ramps and rollers. Figure 1 illustrates the activities and participants.

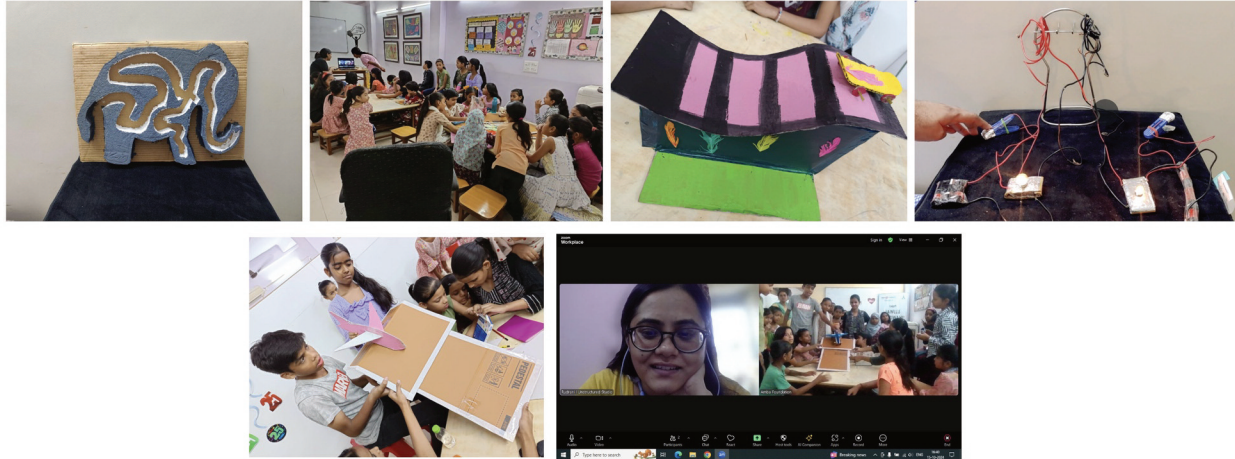


Figure 1. From left to right: an animal maze, students engaged in an activity at Amba's after-school center, a skateboard roller-on-ramp demonstration, a messaging station using everyday materials, an airplane launchpad station, and a facilitator leading a session virtually.

Assessment Framework

The assessment framework used in this study draws inspiration from the LEGO Creativity Assessment Framework (LEGO Foundation, 2020), which focuses on evaluating creativity through observation and documentation of learners' problem-solving approaches, creative processes, and their engagement with the activity. For the observation component, key questions during the workshops included: Did the student demonstrate a unique idea while engaging with the activity? Did the student meet the learning goals? What approach or method did the student use for creative problem-solving? Did their outcome or process address the design challenge? Qualitative assessments were also conducted through informational interviews for more structured measurement. ZubHub, a digital platform developed in-house by Unstructured Studio, was used to help students document and collaborate on their projects with like-minded peers. However, the results obtained from using this tool are preliminary and will be explored in future studies. Table 1 shows the key assessment questions used for this research.

Skill	Interview Questions (in English)	Interview Questions (in Hindi)
Creativity	If you want to play a game with your friends, which game would you like to play? If you were to design a new game, what kind of game would you design? If your friends don't like the new game, would you create another one? (Yes/No) Do you often create games like this? (Yes/No) Do you often get new game ideas? (Yes/No) What kind of ideas do you get? Out of all the activities we've done so far, which one is your favorite and why? If you were to improve any of the activities we've done so far, would you choose to do so? (Yes/No) If yes, which one?	अगर आप अपने दोस्तों के साथ कोई गेम खेलना चाहें, तो आप कौन-सा गेम खेलना पसंद करेंगे? अगर आपको एक नया गेम बनाना हो, तो आप किस तरह का गेम बनाएंगे? अगर आपके दोस्तों को वह नया गेम पसंद नहीं आए, तो क्या आप कोई और गेम बनाएंगे? (हाँ/नहीं) क्या आप अक्सर इस तरह के गेम बनाते हैं? (हाँ/नहीं) क्या आपको अक्सर नए गेम के आइडिया आते हैं? (हाँ/नहीं) आपको किस तरह के आइडिया आते हैं? अब तक की गई सभी एक्टिविटीज में से आपकी सबसे फेवरेट एक्टिविटी कौन-सी है और क्यों? अगर आपको अब तक की गई किसी एक्टिविटी को सुधारने का मौका मिले, तो क्या आप ऐसा करना चाहेंगे? (हाँ/नहीं) अगर हाँ, तो कौन-सी एक्टिविटी?
Communication	Imagine you are sitting with your friends and working on a school activity. Now, one of your friends suggests a different way to do the activity. Would you listen to them? (Yes/No) If yes, do you usually listen to their suggestions? If you get an idea for something fun, like playing a new game, do you share it with someone? (Yes/No) If yes, who do you share it with?	कल्पना कीजिए कि आप अपने दोस्तों के साथ बैठकर स्कूल की कोई एक्टिविटी कर रहे हैं। अब, आपका एक दोस्त उस एक्टिविटी को करने का एक अलग तरीका बताता है। क्या आप उसकी बात सुनेंगे? (हाँ/नहीं) अगर हाँ, तो क्या आप आमतौर पर उनके सुझाव सुनते हैं? अगर आपको कुछ मजेदार करने का आइडिया आए, जैसे कि कोई नया गेम खेलना, तो क्या आप वह आइडिया किसी के साथ शेयर करते हैं? (हाँ/नहीं) अगर हाँ, तो आप वह आइडिया किसके साथ शेयर करते हैं?
Collaboration	Do you prefer working with friends or by yourself?	क्या आपको दोस्तों के साथ काम करना ज्यादा पसंद है या अपने आप से?
Critical Thinking	Do you see any problems in your school, neighborhood, or community? (Yes/No) If yes, what kinds of problems do you see? Can you think of any ideas to solve these problems?	क्या आप अपने स्कूल, मोहल्ले या कम्युनिटी में कोई प्रॉब्लम्स देखते हैं? (हाँ/नहीं) अगर हाँ, तो आप किस तरह की प्रॉब्लम्स देखते हैं? क्या आप सोच सकते हैं कि इन प्रॉब्लम्स को कैसे सॉल्व किया जा सकता है?

Table 1. Key assessment questions

FINDINGS

This section presents qualitative and quantitative data analysis based on informational interviews conducted with children and educators through video conferencing tools. The findings are organized according to the 4C skills and illustrate students' development in each area, shedding light on children's experiences with low-cost tinkering activities.

Creativity

Students generated a wide range of ideas related to game design in response to the question, “If you were to design a new game, what kind of game would you design?” Their ideas included making toys, educational games, and physical games. They mentioned creating artifacts using recyclables such as paper and waste bottles, and then using those artifacts (e.g., balls, fish, boats, puzzles) for play. For example, one student proposed making dice out of clay, while another suggested creating paper currency to use in board games. One student suggested making dresses out of paper, and another proposed building swings from ropes. Their ideas reflected the use of everyday materials and drew on familiar games to develop fun and engaging experiences.

Sixty-seven percent of students (20 out of 30) responded “Yes” to the question, “If your friends don’t like the new game, would you create another one?” This substantial number of positive responses suggests that many children are willing to adapt their ideas in response to peer feedback. Nearly half of the students, 47% (14 students), reported that they often get new game ideas, which suggests that the program may help children unlock their creative potential, especially since this percentage is higher than in a previous baseline assessment conducted with a similar demographic (Sethi et al., 2020). At the same time, only 33% of students (10 students) said that they often create new games. This lower figure may reflect the fact that the question focused specifically on game design.

When asked about their favorite creative learning activity from the program, students mentioned designing a maze, ramps and rollers, and simple circuits, which were also highlighted in the previous section. For each activity, students shared their perspectives in their own words: “It shows adventure,” “The sliding aeroplane was balancing well,” and “It is related to our life, light is a very necessary instrument.” They also shared ideas on how the activities could be improved. For example, some suggested using torches as a light source instead of mobile phones for those who may not have easy access and providing more time to create different maze designs and shapes.

Communication

To gauge their openness to sharing their creative ideas with peers, students were asked how willing they were to listen to suggestions from friends about changing their approach to a project. All 30 students (100%) answered “Yes.” However, six (20%) added that they would only consider suggestions if they judged the suggestions to be better than their own ideas. They were also asked, “If you get an idea for something fun, like playing a new game, do you share it with someone?” Twenty-nine students (97%) responded “Yes,” of whom 28 (97%) said they share ideas with friends, eight (28%) with family members, and one (3%) with teachers. The lower percentage for teachers may reflect the fact that these children are part of an after-school program linked to this research study, as children spend considerably more time at home and school. This finding highlights an oppor-

tunity to further examine why creative idea exchange between teachers and students is limited.

Collaboration

To understand their preferred working style, students were asked, "Do you prefer working with friends or by yourself?" Seventeen out of 30 students (57%) said they liked working with friends, while 13 (43%) said they preferred working alone. These results showed that there was not a substantial difference between students who prefer working in teams and those who prefer working independently. Still, the considerable number of students who feel comfortable working alone suggests the need to further investigate the reasons behind this preference and explore ways to better support collaboration among students who prefer independent work.

Critical Thinking

Students demonstrated their critical thinking skills in the interviews by sharing examples of problems they had observed in their school, neighborhood, or community, along with the solutions they believed could address them. Twelve students (40%) said "Yes" to the question about whether they had observed any problems around them. They shared a wide range of common issues, including car accidents due to a lack of traffic control, animal mistreatment, littering, and limited access to education for low-income families. Regarding solutions, 30% of the surveyed students responded, suggesting ideas such as installing dustbins and creating more awareness through posters to stop littering, providing free education for underserved children, and enforcing stricter traffic laws. It is worth noting that only a minority of students offered solutions. Among those who responded, many shared ideas they had heard about or observed being implemented in their communities. It is possible the question was not framed in a way that effectively assessed their ability to think critically and propose original solutions. Despite the low percentage of students who were able to suggest solutions to everyday problems, this presents an opportunity to further investigate children's critical thinking skills and explore how best to develop their capacity to address real-world challenges.

Teacher Interviews

Unstructured Studio's staff interviewed two teachers supporting the after-school program to document learning developments observed in students over the past year. Their responses indicated that students had made significant progress in creative skills, confidence, and overall program participation. According to the teachers, some students previously had basic ideas for creative art and craft projects, but with the skills and experience gained through the program, they were now empowered to take their ideas to the next level. They had developed expertise in choosing the right materials for the activity and in applying their ideas and thinking to the project's creation. Students who were once hesitant to take risks, make mistakes, and share their

thoughts were now doing so with much greater confidence. Overall, their interest in the activities had grown, and they were participating more actively compared to before the program.

DISCUSSION

Overall, the creativity assessment revealed promising developments in students' 4C skills over one year.

(1) How do low-cost creative learning experiences contribute to student development in rural environments?

The activities were conducted in an after-school program with limited access to the proper materials. Students had no access to expensive technology or equipment, and even computer access was limited. Despite these constraints, we were able to adapt our activities to be low-cost, contextually appropriate, and reliant on locally available materials to keep students engaged and nurture their creative skills. These low-cost activities encouraged students to solve problems using what was available, to work together, and to think creatively. As a result, they showed remarkable improvements in their 4C skills over one year.

(2) How do these experiences strengthen the 4C skills (creativity, critical thinking, communication, and collaboration), and how can these developments be measured?

In the creativity assessment, nearly half of the students generated various ideas in response to the question about game design. These trends reflect a significant improvement in students' creative confidence compared to the beginning of the study, when many were often quiet and hesitant to share their ideas or engage in creative thinking. Before the program began, preliminary observations were made about children's openness to sharing their ideas and collaborating with others. These observations revealed children's resistance to sharing their work and a preference for working independently, likely reflecting the competitive nature of traditional Indian educational systems. This research study showed improvements on this front, with a majority of students demonstrating openness to their peers' ideas and sharing their own with friends and family. In terms of critical thinking, students demonstrated the ability to identify problems and suggest solutions based on their observations and what they believed could benefit their communities.

Overall, the creativity assessment inspired by the LEGO Foundation's creativity assessment framework combined interview questions that included four sets each to gauge students' development in a 4C skill area, and encouraged children to document their work on ZubHub so educators could refer to it later. This approach worked well, along with observations made by educators during each workshop and documentation through notes and blog posts. Later, drawing on quantitative and qualitative summaries helped assess these improvements.

CONCLUSION

One area for future improvement is the creativity assessment itself. Although students engaged in a year-long program, the assessment was conducted over only four days. For future studies, assessments could be conducted over a longer period and include more individual interviews to gain an in-depth understanding of each student's development of 4C skills and thought processes. Future studies should also incorporate formal baseline assessments. In this research, some preliminary observations were made but not captured to allow for a pre-post comparison. As mentioned earlier, ZubHub (the studio's in-house platform) can be continuously integrated in such settings to help students and educators document their projects. This documentation would enable students, educators, and researchers to track and analyze creative development over time, including growth in communication, collaboration, and critical thinking.

Another focus could be addressing learning areas for improvement observed in the study. Lower engagement with teachers highlighted the need to understand the reasons behind this and to strengthen student-teacher relationships. The collaboration results showed mixed responses from students, with nearly equal preferences for working with friends and working alone, which warrants further research to understand what support might be needed to accommodate different working styles. Critical thinking warrants the most attention, as students' proposed solutions drew on familiar concepts from their immediate surroundings and showed limited originality. Therefore, helping students develop the capacity for more unconventional thinking and creative problem-solving is necessary.

Lastly, the activities in this study were low-cost and low-tech, keeping in mind the setting, its needs, and feasibility. Future studies could explore either low-cost versions of high-tech creative tools or direct access to such technologies (e.g., *OctoStudio*, *Scratch*, *Makey Makey*) and examine their impact on student learning in comparison with non-tech activities. Overall, this study has shown significant development in students' 4C skills and highlighted areas of improvement in each of these skills: developing critical thinking skills, supporting children who prefer working alone, and strengthening student-teacher relations in schools.

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