

Teacher Training Mediated by Creative Learning

A Mechanism to Promote Constructionist Education Among Teachers and Students

Veronica Gomes dos Santos¹, Thais Eastwood Vaine¹, and Gabriela Breviglieri¹

¹ Creative Schools Institute, Brazil

Abstract

Constructionist education, based on its fundamental premises, has consistently proven effective in fostering a more holistic and integrative education. These premises align with the aspirations of formal education, which is monitored and evaluated through external and standardized assessments that do not always capture such comprehensive development. Drawing upon the tenets of constructionism, we hypothesize that pedagogical practices grounded in Creative Learning (CL), an outgrowth of constructionism, have the potential to directly impact student learning and performance, and that this impact can be captured by assessments. Consequently, we acknowledge that for such success, the formative process must be linked to the development of teaching practice that aligns with the desired transformative ideal, moving away from reproducing a traditional and passive education that is misaligned with the aspired protagonistic stance. Thus, this study investigated the impact of teacher training grounded in CL principles on pedagogical practice and student reading and writing performance. This exploratory research was conducted in two phases. The first phase (2023) involved direct monitoring and intervention with 14 teachers, 16 classes, and 377 students from one school district, divided into a control group (CG) and an intervention group (IG). The second phase (2024) focused on the potential for scaling up and replication, with a sample of 3 school districts, 101 teachers/classes, and 2600 students, and included a cascading formative layer. The results showed significant gains in phase 1 and promising results in phase 2 (currently under analysis), confirming the direct relationship between a constructionist formative approach, the transformation of teaching practice, academic performance, and holistic education.

Keywords and Phrases: adoption of creative learning, creative learning, professional development, transformation of teaching practice

1. Relevant Literature - Teacher Education as a Transforming Mechanism

Education has long required a necessary methodological revision and a re-signification of the roles of teachers and students (Freire, 1996; Moran, 2014; Papert, 2008; Resnick, 2020), where many layers of this relationship have undergone substantial transformations and need to align with the authorial and protagonistic stance that



students are rehearsing in society (Freire, 2021; Perrenoud, 1994; Viegas & Osório, 2016). To achieve this transformative education, it is essential to have professionals who practically embody what they will mediate and intend to develop in students (Papert, 1980; Valente, 1996). This requires looking beyond investing in resources and focusing on professional development that addresses both the instrumental aspect (Mishra & Koehler, 2006) and the professional growth of teachers. This investment demands an intentionality of gradual transformation, moving beyond the accumulation of information and novelties, impacting teachers' attitudes and, consequently, students (Marcelo, 2009). Thus, it is necessary to provide a formative process that fosters a more protagonistic, authorial, critical, and creative stance, mirroring what is expected to be developed with students. This process should be constant, processual, and reflective (Freire, 1996).

More agile and active educational approaches, such as Creative Learning (Resnick, 2020) and Learning Through Play (Zosh et al., 2017), hold great potential to support professional development, aiming at both the impact on teaching practice and student learning. Both approaches are based on the premise of creating learning environments and experiences that provide active engagement with a personally meaningful problem or challenge, social interaction, experimentation through iterative processes, and the establishment of a joyful, playful, and exploratory atmosphere, as advocated by constructionism.

2. Methodology

Based on the aforementioned, this exploratory study, conducted in partnership between the Education Development Center (EDC) and the Instituto Escolas Criativas, was organized in two phases. The first phase (2023) involved direct monitoring and intervention with 14 teachers, 16 classes, and 377 students from one school district, divided into a control group (CG) and an intervention group (IG). Building on the positive results, the second phase (2024) focused on the potential for scaling up and replication, with a sample of 3 school districts, 101 teachers/classes, and 2600 students, and included a cascading formative layer. In both studies, participants were divided into 2 groups, designated as the control group (CG) and the intervention group (IG). To establish a baseline and monitor the intervention's results, initial and final tests were administered, developed based on official large-scale assessment frameworks in the country. Following the tests, the formative intervention began, totaling 12 hours in phase 1 and 24 hours in phase 2, delivered through both in-person and remote modalities. The formative process and the support materials used (Didactic Sequences) were developed based on the non-negotiable principles of Creative Learning: Creation; valuing student voice; proposing good questions; collaborative work; playful learning atmosphere; meaning-making; challenging situation; and problematization.

For the analyses of the teacher education process in phases 1 and 2, the theoretical assumptions of Reflexive Thematic Analysis (RTA) (Marques & Graeff, 2022) were used. Regarding the methodology for analyzing the assessment data, the assumptions guiding the ordinary least squares (OLS) regression model with treatment as a predictor were employed, specifically for phase 1, as the second phase is currently undergoing analysis.

3. Results, Impact and Reflections

In phase I, Table 1 presents the average reading and writing scores for each group type (max. = 10). [138, 193] We observed that students in the IG outperformed those in the CG after only six weeks of intervention. [139, 194] An Analysis of Variance (ANOVA) revealed that this difference was statistically significant (partial eta squared, $\eta^2 = .02$).

Group	N	Mean	Lower quartile (25%)	St. Dev
Intervention	201	7.81	7.34	2.88
Comparison	176	7.01	6.45	3.32

Table 1: Mean Reading & Writing Score by Group.

Furthermore, the approach demonstrated a potential to accelerate learning in lower-performing students, which is currently under investigation in new studies in 2024. This potential was highlighted when evaluating student results in quartiles, where the 1st quartile (25% of students with the lowest performance) in the IG showed the most significant improvement in the study, indicating enhanced learning opportunities and equity. Drawing from the RTA, we highlight excerpts from reports of teachers who participated in the formative process, emphasizing the importance of the intervention for student learning.

“This experience engaged everyone, including children who were still experiencing difficulties with reading. They took advantage of this opportunity to read together with their classmates, taking turns reading to each other. This was very encouraging for them. The exchange, the act of taking materials home and having the responsibility to return them or bring others they had at home, was all very positive.” (Teacher A’s testimony)

Based on the study phases, we understand that the formative experience focused on the tenets of constructionism, through Creative Learning, by placing the teacher in an active learning perspective, impacts the transformation of their pedagogical practice and directly reflects on the performance of the students involved, which can also be captured in external evaluations. In the continuation of the experience, a potential for scaling through formative multiplication was observed, with impacts noted in teacher monitoring, while the remaining analyses are in the final stages.

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