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Original Paper

Reframing Productive Failure for L2 Speaking through Short-Cycle Repetition

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Abstract

Productive Failure (PF) yields strong learning gains in structured STEM domains, but evidence from L2 speaking is inconsistent. Oral production involves real-time processing and dominant L1-based encoding routes, which restrict exploratory attempts and weaken the cognitive conflict central to PF. Drawing on Complex Dynamic Systems Theory (CDST), this study argues that the limited effects of PF in speaking arise not from flaws in the mechanism but from insufficient repetition to stabilize emerging patterns, as also noted by Rahayu (2021). To address this limitation, the paper proposes a short-cycle PF model consisting of rapid, repeated loops of generation, consolidation, and regeneration. Each cycle increases the visibility of structural differences, disrupts entrenched L1.

Keywords

Productive Failure (PF), L2 speaking, Short-cycle PF model, Complex Dynamic Systems Theory (CDST)

1. Introduction

Productive failure(PF) has demonstrated high efficacy in STEM disciplines (Kapur, 2015; Loibl et al., 2017) in which unguided problem solving is used to generate suboptimal solutions that train learners to undergo further consolidation. Nonetheless, the results of PF in the language learning, specifically speaking, are much more mixed. Oral tasks demand real time formulation, instant conceptualization and heavy reliance on L1-based encoding routes(Levelt, 1989/1999; Levelt, Roelofs, & Meyer, 1999, Kormos, 2006). These characteristics may limit learners' opportunities to figure out their constraints in the exploration phase of PF, and thereby reduce the productive value of the initial PF phase.

Complex Dynamic Systems Theory (CDST) also demonstrates that oral development follows a non-linear trajectory and is characterized by variability, recurrent errors and even backsliding (Larsen-Freeman, 2006). According to Rahayu (2021), virtual oral tasks could not be conducted using

PF not because the mechanism does not work, but because the repetition was not enough to automatize the new pattern. Most PF designs are based on a single generation-consolidation cycle, which is inadequate for stabilizing oral expression patterns that require repeated practice.

Accordingly, this paper investigates the mechanisms of short-cycle, repeated PF in oral English learning and explores its pedagogical implications, aiming to provide a more feasible application model for PF in language education.

2. Literature Review

2.1 PF in Structured and Less-Structured Domains

PF (Kapur, 2008; 2010) is a learning design that encourages learners to solve problems independently without guidance before instruction. The typical PF process consists of two stages: the Generation Phase, where learners autonomously attempt problem-solving using existing knowledge, often producing incomplete, suboptimal, or incorrect solutions; and the Consolidation Phase, where instructors guide learners to compare their self-generated approaches with expert solutions through contrastive analysis, thereby promoting conceptual organization and internalization (Kapur & Bielaczyc, 2012). In structured fields like mathematics and physics, extensive research has demonstrated that PF significantly enhances conceptual understanding and transfer abilities, with its mechanism driven by a learning cycle where early unsuccessful attempts trigger cognitive conflict and lead to deeper structural restructuring (Kapur, 2014).

With language learning, the results are not as strong. PF demonstrates positive results in comparably structured tasks (writing and reading), whereas the impact of PF in open-ended oral tasks is almost equal to the direct instruction (Rahayu, 2021). Researchers also discussed that non-STEM domains (Nachtigall, Serova, & Rummel, 2020), such as SLA, lack the clear structural boundaries of mathematical problems, making it difficult to fully activate PF's core mechanisms. In other words, PF's performance in language learning exhibits domain contingency, requiring reinterpretation or adaptation based on the specific characteristics of language tasks.

2.2 Why PF Underperforms in Oral Tasks

Speaking happens in real time. Learners must think of their ideas, choose words, form sentences, and manage interaction almost at the same moment (Levelt, 1989/1999; Kormos, 2006). Under the time pressure, learners always select the easiest and most familiar resources (Swain, 2005)., including L1 structures, memorized phrases, or incomplete interlanguage patterns. As a result, learners often produce sentences that can be understood but are not fully correct in the target language. Since communication continues, learners do not see these forms as mistakes, and they do not experience the failure that PF normally depends on.

Feedback in oral communication adds another difficulty. In many conversations, people rarely correct each other directly. They usually try to keep the talk going and focus on understanding the message (Long, 1996; Gass & Mackey 2006). Because the feedback is indirect and unclear, learners cannot

easily notice the gap between their own expressions and more target-like forms. Without this clear contrast, it is hard for them to reorganize their language knowledge. In addition, oral performance involves many different elements at the same time, such as discourse structure, pragmatic choices, common lexical combinations, and meaning links across sentences (Skehan, 1998; Ellis, 2008). These elements are often hidden and spread across the whole stretch of speech. For this reason, oral tasks do not have clear structures or single correct answers, which makes them very different from well-structured tasks like mathematics.

Research on second language development further shows that oral ability grows in a non-linear way (Larsen-Freeman, 2006; Verspoor & van Dijk, 2011). Learners often move forward and backward, and the same errors may reappear after some time. Improvement usually comes from many repeated attempts. Each attempt brings small adjustments, and these small adjustments slowly become more stable over time. Rahayu's study (2021) provides evidence for this interpretation. In her PF-based virtual oral learning experiment, learners completed only a small number of repeated speaking attempts,which she argued was insufficient for the automation of oral patterns. She therefore concluded that the weak effects of PF in oral tasks were not due to the PF mechanism itself, but to the insufficient repetition.

3. Towards a Short-Cycle, Repeated PF Model for L2 Speaking

The preceding two chapters show that the instability of PF in oral tasks stems from the non-linear nature of oral development. To address the lack of repetition so that oral expression cannot stabilize, the chapter suggests a PF modification strategy that would be more appropriate in oral activities: a short cycle repeated PF model. This hypothesis assumes that the effectiveness of PF depends on its frequency (how often) rather than the intensity of a single task (how strong).

3.1 Why PF Needs Repetition in Speaking

Traditional PF presupposes that learning is a process which is cyclical with failure creating a cognitive conflict which is bound to result in structural reorganization. Nevertheless, this cycle is hardly observed in the oral work as it was mentioned previously. Most oral error would not be failure since it can be comprehended even not being target-like. Learners also struggle to perceive subtle structural variation, since the L1 is highly automated and dominates real-time production. This limitation is facilitated by the non-linear development of the oral state. An input or a single effort rarely changes the expressive pattern of a learner, and the positive progress is most often the result of a series of minor changes. The results of Rahayu (2021) also noted that oral PF tasks did not surpass the direct instruction due to the inadequacies of repetition frequency. This implies that the issue cannot be the theoretical application of the PF but its application in oral learning. This results in a new conclusion: PF of speaking needs to be seen as a process that occurs continuously and can be placed to take into consideration cumulative and repetitive character of oral development as opposed to being an eventual event.

3.2 The Short-Cycle PF Micro-Loop

The proposed study suggests a PF micro-cycle model which will be based on the weaknesses known in the sections above. The model operates through three processes that are closely interconnected and these are generation, consolidation, and regeneration. These are the stages that repeat within a short period of time.

During the stage of generation, learners will not be guided but in group work and will make an attempt to express their ideas. This stage is aimed at triggering their existing linguistic means, and to obtain suboptimal and variable expressions. These initial attempts provokes learners' perception of the discrepancies or knowledge gap between their own outputs and the target expression, thereby the system is initiated instead of focusing on failure.

The consolidation stage provides immediate and focused instructional support. At this point, the instructor introduces template expressions, ordered structures like time or cause chains, pragmatic frames, important lexical units or brief substitution examples. This stage is aimed at highlighting the difference between the learner production and target types more clearly to allow learners to create a rough sketch of the underlying pattern. This step can be regarded as a simplified variant of schema abstraction which points out structure but does not necessarily involve theoretical elaboration.

During the regeneration sequence, the learners repeat a similar expression task immediately after the consolidation stage. This will enable them to employ the newly drawn structure, reinforce the new patterns, modify their manifestations, and initiate the stabilization of a prototype of the modified form. Regeneration also enhances learners' awareness of the gap between the initial and modified attempts that are critical in the structural development. This step is normally less stressed in the classic PF designs and in the absence of it, new language patterns can hardly be consolidated.

3.3 Why Short Cycles Work

The effectiveness of multiple PF cycles in short intervals is due to the ability to correspond to the developmental features of oral language that also provides a possibility of restructuring learners' speaking pattern. Each cycle introduces a small disturbance to the learner's habitual which is based on the L1 production. When this kind of disruption is summed up in a series of attempts, the major mode of expression will start to give way, space opening up in its place to allow other forms to emerge. Through repeated cycles of generation and consolidation, learners gradually form a rough sketch of the underlying pattern. This sketch may appear in their growing awareness of how a story is organized, how reasons are presented, or how cause–effect relationships are expressed. These early sketches do not yet constitute full schemas, but are convenient conventions which may be used to direct expression.

With repeated activation of the same expression pattern several times within a limited duration, internal pathways of activated pattern strengthen. This repetitive activation reduces processing effort and promotes one to develop a new pathway of expression as a default. The serial repetition of several attempts also enhances the conspicuity of the dissimilarities earlier and later outputs. Each new attempt produces a slightly different surface form, and these differences help learners develop structural

stability across their own expressions. Because oral language development is inherently variable and non-linear, the effectiveness of a single PF design is easily overlooked by natural fluctuations in performance. these fluctuations can be bridged by a sequence of PF cycles, in which minor adjustments can be added together to produce significant structural change. Repeated implementation of PF helps the learning process to change into a continuous process instead of a single and separate episode, which further aids the internalization of new patterns.

4. Pedagogical Implications

Unlike PF in STEM contexts, oral tasks require more frequent attempts, clearer pattern visibility, and repeated structural activation. PF should therefore be implemented not as a single long cycle but through several short micro-cycles within one lesson. A brief generation phase in each micro-cycle begins with learners expressing ideas with the existing resources but emphasis is made on the fluency rather than accuracy. This is then succeeded by brief period of consolidation where experts provide structured expressions, highlight contrasts, and present accessible pattern sketches. Learners then immediately perform the task again to activate the new pattern while it is fresh. PF becomes a cumulative learning process once many rounds have been made.

Instruction should guide learners to notice differences between versions of an expression, to analyze how people can organize thoughts differently and to see how time or cause effects are expressed. This is aimed at enabling learners to have the perception of the structure which is what actually drives reconstruction in oral PF.

Within the integration phase, instructors should provide learners with portable abstract schemes that can transfer across tasks including semantic chains to arrange the information, pragmatic templates to represent frequent communicative operations, and lexico-grammatical frames to provide reasons, justification or story sequences. Over time and by repetition of PF structures, these structures start acting as prototype patterns and eventually become the default expressive patterns of learners.

To ensure that these prototype patterns stabilize, PF must be combined with task repetition. PF makes the structure visible, while task repetition allows it to settle. Same-task, similar-task, and functional repetition provide opportunities to reactivate and refine the pattern until it becomes more automatic.

Feedback should also shift from error correction to structural alignment whereby instructors perform the role of structure highlighters, one who notices the structural differences between expressions, identifies structural gaps and provides short micro-recasts as opposed to complete rewrites. By encouraging learners to compare several different versions of their own output, it is possible for learners to discover recurring patterns and strengthens structural awareness.

In summary, short-cycle multiple PF cycles offer a feasible approach to oral English instruction. They work effectively because they are repeatedly generated, compared, and integrated and therefore allow small structural changes to accumulate into stable expressive patterns.

5. Conclusion

This paper explores the practicability of PF in L2 oral language acquisition and suggests ways to improve its instability in oral activities. A systematic analysis of PF mechanisms, oral task characteristics, and the nonlinear trajectory of oral development shows that PF's underperformance in oral communication is not due to methodological failure, but to oral expression's high dependence on repetition and sustained activation.

To address these challenges, this work proposes a short-cycle repeated PF model specifically designed for oral language learning. Unlike traditional PF's single-phase approach, this model employs multiple microcycles. It activates expression patterns quickly through rapid production, pattern manifestation, and regeneration, allowing learners to see, compare, and modify. This frequent generation and integration not only reduces reliance on L1 expression patterns but also helps learners develop an initial prototype of expression patterns, which gradually solidifies through repeated practice.

Future research could evaluate how cycle frequencies, types of tasks, and structural explicitation approaches affect oral pattern restructuring and the viability of short-cycle PF in classrooms, virtual learning environments, and examinations. The PF microcycle framework developed in this work gives empirically supported theoretical support for task design and classroom organization in oral language teaching and a new approach for increasing PF applications in language acquisition.

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