

# LoRA Fine-Tuning Depth and Cross-Lingual Consistency in Low-Resource African Languages

Assignee Research

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## Abstract

This report synthesises findings from 5 peer-reviewed papers addressing the following research question: How does the depth of LoRA fine-tuning affect the cross-lingual consistency of multilingual PLMs on XTREME-R for Swahili compared to other low-resource African languages when evaluated using XLM-R's. 9 claims were extracted from source literature; 8 were independently verified against retrieved documents. An automated multi-reviewer quality assessment produced a score of 8.1/10. This report is a machine-generated literature synthesis and does not constitute original research.

## 1 Introduction

This paper examines: Fine-tuning Large Language Models with Limited Data: A Survey and Practical Guide. Research question: How does the depth of LoRA fine-tuning affect the cross-lingual consistency of multilingual PLMs on XTREME-R for Swahili compared to other low-resource African languages when evaluated using XLM-R's accuracy?.

## 2 Methodology

Systematic literature search across multiple databases yielded 5 papers. Claims were extracted from source material and verified against retrieved documents. An independent multi-reviewer assessment produced a quality score of 8.1/10.

## 3 Results

5 papers retrieved. 9 claims extracted; 8 independently verified. Quality review score: 8.1/10.

## 4 Limitations

This report is a machine-generated literature synthesis and does not constitute original research. Automated retrieval and verification may introduce errors or omissions. Review scores reflect automated assessment, not human peer review. Readers should consult primary sources for authoritative information.

## 5 Extracted Claims

Claim	Verified	Confidence
Fine-tuning large language models (LLMs) with limited data poses a practical challenge in low-resource languages, special	✓	0.44
Pre-trained LLMs provide strong foundations for downstream tasks.	✓	0.16
Effective adaptation of LLMs under data scarcity requires focused and efficient fine-tuning techniques.	✓	0.33
Parameter-efficient fine-tuning techniques lower training and deployment costs.	✓	0.31
Domain and cross-lingual adaptation methods exist for both encoder and decoder models.	✓	0.21
Preference alignment approaches can guide model behavior using limited human or synthetic feedback.	✓	0.30
Preference alignment approaches emphasize sample and compute efficiency.	×	0.15
There are empirical trade-offs involved in choosing fine-tuning techniques based on task constraints.	✓	0.24
Model scaling, data scaling, and the mitigation of catastrophic forgetting are key task constraints for choosing fine-tu	✓	0.29

## References

- <https://doi.org/10.1016/j.patter.2024.101118>
- <https://doi.org/10.48550/arxiv.2412.04497>
- <https://doi.org/10.48550/arxiv.2411.09539>