

1. Problem

- ❑ Programming Error messages: Vital feedback but often cryptic.
- ❑ No work has quantified the use of L1 (Afrikaans and isiXhosa) instead of English when preferred by programmers.

StackOverflow?

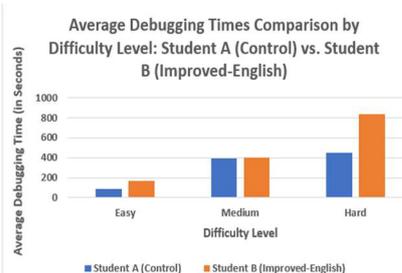
Cryptic Java error: “java.lang.StackOverflowError”

Cryptic Python error: “KeyError: 'name'”

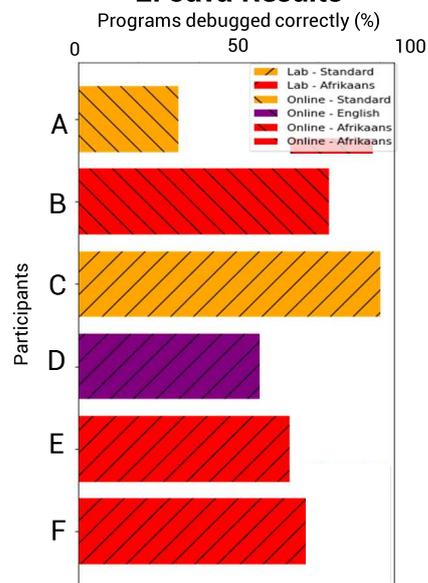
4. Results

What is a “KeyError”?

1. Python Results



2. Java Results



3. User Perception:

Participants preferred improved error messages over standard ones.

5. Conclusions

Python:

- ❑ English-Improved errors: did not improve debugging speed.
- ❑ Translated (isiXhosa): did not boost debugging speed, but helped isiXhosa speakers solve medium and hard tasks.
- ❑ User preference: messages in first language more readable and understandable.

Java:

- ❑ English: did not improve debugging speed.
- ❑ Afrikaans: did not improve debugging speed.

6. References

[1] David Pritchard. 2015. Frequency distribution of error messages. In Proceedings of the 6th Workshop on Evaluation and Usability of Programming Languages and Tools. 1–8.

2. Aims

- ❑ Improve error message readability using established guidelines.
- ❑ Present improved messages isiXhosa and Afrikaans.
- ❑ Investigate the impact of the improved and translated error messages on debugging performance and user preference.

3. Methods

Dataset:

- ❑ subset of error messages from Prichard [2015] (Python) and BlueJ database (Java).

Template Design:

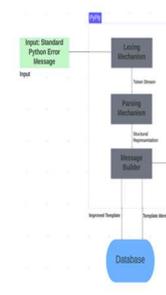
- ❑ 1st-year CS tutors applied Denny et al. [2021] readability guidelines to Python and Java error message templates.
- ❑ Guidelines: word economy; no jargon; simple vocabulary; and full sentences

Translation:

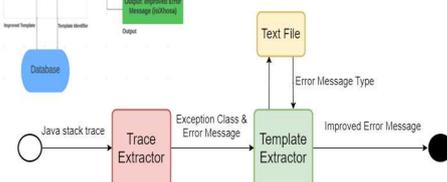
- ❑ isiXhosa (Translated by researcher with the help of Google Translate)
- ❑ Afrikaans (Afrikaans Computer Science student)]

System:

Python System



Java System



User Study:

- ❑ 3 groups for Python (standard, improved-English, improved-Xhosa), lab/online study for Java (standard, improved in English/Afrikaans).
- ❑ Pre-survey for participant background and programming proficiency, debugging tasks, post-survey for participant feedback.

TEAM:

Danny Guttman | GTTDAN002
Mandisa Tunzi | TNZMAN002

SUPERVISOR:

Dr Zola Mahlaza
zmahlaza@cs.uct.ac.za