Access and Success at the University of Cape Town: Language Development Group

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# Terms of Reference

This report was commissioned by Catherine Hutchings from the Language Development

Group, on the 1st of March 2018, due the 12th of April 2018.

The following instructions were received:

1. Investigate and briefly describe the scenario at the Language Development Group, explaining its vision and goals, services, operations, and their impact.
2. Isolate a single challenge to access and success, and describe the limitations and opportunities that it presents for innovation.
3. Research alternatives from which to derive a tailored solution to the challenge that was isolated.
4. Draw conclusions on the overall situation by examining the implications of what was found.
5. Make recommendations as to what should be done to improve the access and success of students making use of the Language Development Group.

# Synopsis

Many universities use english as the language medium, this is both beneficiary- in setting one standard that everyone can conform to and communicate in, and detrimental to students who do not come from an english background. These students to struggle to understand technical terms when they hear it in english as it is difficult to translate, or find similarities in their native language. This limits the way students are able to express themselves when it comes to learning, communicating and writing.

In addition to this, teaching and learning requires reliable communication between students, their classmates and their lecturer. This communication forms basis for ongoing engagement in coursework required to succeed at the University. This engagement can often be hindered by the language barrier that students who are not natively english students face.

The Language Development Group is an organisation at the University of Cape Town that promotes and facilitates access to higher education at both undergraduate and postgraduate levels within an ethos of social justice and redress. They have been in existence since the 1980s and formed as part of the University’s first responses to inequality.

The Language Development group offers courses to undergraduates that are in the extended degree programme across all faculties. These courses have a limited intake and preference is given to students with low scores in the Academic Literacy test that forms part of the National Benchmark Test that all applicants to the University are required to write. Preference is also given to black students, as the Department of Higher Education requires the University to have systems in place to redress and improve academic literacy of students from previously disadvantaged backgrounds.

The Language Development Group also caters more to the Faculty of the Humanities as their courses are focused on issues such as reading, writing and self expression. Such issues are critical to the humanities, but not so much to other subjects.

They administer workshops with academic staff across the University to teach them how to read and understand work that has been written by students who may struggle to express themselves in english.

It has not been financially feasible for the Language Development Group to collaborate with other universities thus far and therefore only it offers its services to students from the University of Cape Town.

The Language Development Group works largely with online material. This poses a challenge to students who are not privileged to have a reliable means of accessing this material, and classrooms are not equipped for all students to have access to online resources.

The measures taken by the Language Development Group has implemented an initiative to make the University a more diverse and comfortable space by offering Xhosa lessons.

An alternative that the Language development group could explore is the implementation of live lecture translations and speech recognition as algorithms to do so are available on the internet.

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# Introduction

## Subject of the Report

This investigation focuses on the Language Development Group at the University of Cape Town and details its aims and current offerings. It also looks at the challenges faced by the Group and potential solutions to these challenges.

## Background to the Investigation

The University of Cape Town caters to students coming from many different language backgrounds. At the University the english language is adopted as an intermediate language for communication, teaching and learning. This poses multiple challenges to those who are not native English speakers. The Language Development Group aims to create an inclusive environment that incorporates South Africa’s multicultural society and aims to lower language barriers to resources and learning, and by extension, to academic success. There are currently limitations on the impact that the Language Development Group can make, due to financial and human resource constraints. This requires investigation into the use of technology that may aid the Language Development Group in overcoming these limitations.

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## Objectives

* Describe the current state of the services and offerings at the Language Development Group
* Assess the effectiveness, relevance and reach of these services while taking into account the University context
* Identify challenges to the Language Development Group and single out the one with the largest impact
* Draw conclusions based on the challenge and assessment
* Make recommendations based on research to overcome the challenge

## Methods

* + 1. Interview

An interview was held with two members of the Language Development Group to find out more about of the current services it offers and how technology could enhance their services.

* + 1. Survey

A survey was conducted and administered on the students at the university polling their current experience of the Language Development Group and how the use of technology could aid the Language Development Group.

* + 1. Research

Online resources pertaining to the Language Development Group and their vision, mission and contribution were thoroughly studied and notes were taken. Personal observations were also taken into account.

## Scope and Limitations

This report is limited to the University of Cape Town and is not an exhaustive report of all the ways that the Language Development Group can improve their services. The financial feasibility and testing of the recommended solutions is out of the scope of the report.

## Plan of Development

The report will discuss the following findings:

* Language Development Group Services and Offerings
* Collaboration outside of the University
* Constraints in the Classroom
* Technology that may aid the Language Development Group

Conclusions will then be drawn, and recommendations to the Language Development Group will be made thereafter.

# Language Development Group Services and Offerings

## Influence of the Language Development Group at the University

The Language Development Group offers the following courses to undergraduate students: “*Language in the Humanities”* and “*Language in the Performing Arts”*in the Faculty of Humanities , “*Language and Communications”* in the Faculty of Commerce*, “Academic and Professional Communication”* in the Faculty of Engineering and the Built Environment*.* In the Faculty of Science it offers “*General Entry Programme for Science” and* to the Faculty of Health Sciences it offers *“Writing Session in Becoming a Professional” and “Literacy Module in Psychology”*. These courses aim to improve academic literacy through teaching correct styles of writing, as well as through the discussion of course material. Due to resource constraints these courses are limited to those in extended degree programmes.

From the survey that was conducted, the following information was gathered:

* 42% of the students that knew about the Language Development Group in the survey wanted to be part of the initiatives that are offered by the Language Development Group.
* 50% of the students said they would consider taking part on the Language Development Group initiatives.

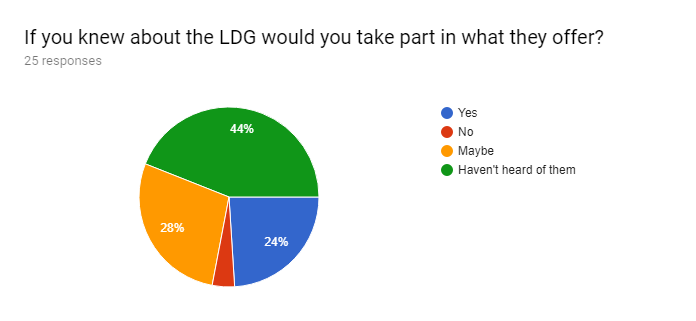


Figure 1 – Pie Chart showing the percentage of people who would like to be part of the Language Development Group.

## Funding for Language Development Group initiatives

Funding for the academic literacy initiatives offered by the Language Development Group is provided by the Department of Higher Education and the Vice Chancellor Strategic planning budget. The funds that are given by the department of Higher Education are to help improve academic literacy and language development for students that are from disadvantaged backgrounds, and preference is given to black students.

Procuring funding is subject to a competitive application process.

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# Collaboration outside of the Language Development Group

## Staff and Faculties

* + 1. Staff

The Language Development Group currently offers workshops for university staff. These workshops address issues within course administration, such as teaching and marking criteria that favours high levels of english literacy. The workshops also guide and teach staff how to read and understand work that is correct but not well expressed due to limitations in the students comprehension of english. Lastly workshops encourage and teach lecturers how to thoroughly explain topics to students in lectures and assignments.

* + 1. Faculties

There is little collaboration between the Language Development Group and other faculties at the university. The courses running over long periods of time are exclusive at the Humanities Faculty and are not publicly available to other faculties.

## Other universities

Currently the Language Development Group only offers academic literacy to the University of Cape Town students, with the exception of a free Massive Open Online Course (MOOC) named “*Writing your World: Finding yourself in the academic space.”*

This MOOC focuses on academic report and essay writing by encouraging participants to write about issues that are relevant to their lives, such as culture, heritage and identity.

It was found that other universities have different methods of addressing language development. The University of Stellenbosch, for example, offers the following courses to their students: “*English for Specific Occupational purposes"* and *“Afrikaans for International Students”.* They also offer what they call *"Tailor-made Language Courses”* (read more about Stellenbosch Language Centre:<http://www0.sun.ac.za/languagecentre/?page_id=151> ).

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# Constraints in the Classroom

# **Interactive Classrooms.**

Most of the course content offered by the Language Development Group is online and therefore is dependent on computer and internet access. The courses have one day per week where they use the computer labs as the learning space. This is for students to start their writing and get assistance with their assignments. Classrooms used by the Language Development Group are equipped with desks and chairs and a writing board only.

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# Technology that may aid the Language Development Group

## Speech to text

Speech to text technology works by taking the captured audio from a microphone, running this through a machine learning based algorithm and then producing accurately transcribed english text. Currently there are many existing libraries and systems which provide this functionality.

These existing libraries tend to provide better performance for native english speaking white males because this is the most prominent grouping in most existing datasets.

The two options investigated were:

* + 1. Google Speech API (Application Programming Interface)

Google’s speech API is the most ubiquitous speech to text solution, being used widely in many applications. However, it is closed source. This means that it would be difficult for models to be adjusted, adapted or expanded.

* + 1. Mozilla Open-Source Speech Recognition Model

Mozilla’s speech recognition model is still in its infancy, as its initial release happened towards the end of 2017.

## Live translations

The live speech translation works by taking english text input and translating this accurately to a specific target language. Once again, many existing solutions exist, including highly successful APIs developed by Google and Amazon.

One factor which is very important to consider is that whichever translation solution is chosen must be able to provide accurate translation into African languages, rather than just between languages of European origin.

* + 1. Google Translate

While their model is generally of quite a high standard, there is not a high focus on African language translation.

* + 1. Open Source Neural-Machine Translation (OpenNMT)

OpenNMT is a MIT initiative which seeks to provide a freely accessible and easily extensible translation system. Being designed from the ground up for extensibility means that even if existing translation models do not exist, or are not accurate enough, users could work with language experts to develop new translation models which are more successful.

# Conclusion

In light of the findings, the following conclusions may be drawn:

## The reach of Language Development Group falls short of all those who need it

The Language Development Group is limited by financial and resource constraints which results in students who need their services to not have access. This has a knock-on effect to their academic performance and social interactions. From the graph it can be seen that a high number of students would like to have access to the academic literacy courses that are offered by the Language Development Group and the financial constraints limit the number of students who get access to the facilities.

## Classrooms are inadequate for interactive learning

The lack of technology in classrooms limits the impact of the courses offered by the Language Development Group and it is often those who are enrolled in these courses that need all the help they can get. The fact that there is not even a projector means that the lecturer often spends time writing out on the board when that time could be spent engaging with the students.

## The use of technology can greatly aid the Language Development Group

Text to speech and live translation can revolutionise teaching by allowing these systems to integrate with the current lecture recording system and translate lectures to the languages they prefer and also provide captions in these languages. This allows students to learn in their native languages which removes the language barrier completely. This, however is dependent on the correct development and implementation of the technology and care must be taken with this process.

It is important to remember that the University of Cape Town is an international institution with lecturers from many diverse backgrounds and not all lecturers will have accents which are easily understandable by existing machine learning algorithms and datasets.

The current development in speech recognition is also quite far removed from native African languages. As such, some languages may not be supported at all, and many may experience poor translation quality. This is not a trivial issue to solve.

It was found the the Google APIs for translation and speech to text were not open source. This limits the ability of the Language Development Group to adapt this software to its needs and improve on it. It also doesn’t allow for the option to address some of the aforementioned issues with translation.

The APIs from Mozilla and MIT are however open source and fresh in their development. The benefit of this is that development is still very active, and the open source nature of the project means that the Language Development Group could actively contribute to the models and adapt them to their own needs. They could then share their developments with other institutions resulting in far reaching global advancements, rather than merely helping those at the University of Cape Town.

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# Recommendations

In light of the findings and conclusions the following recommendations are made:

## Short Term Recommendations

## Implement live lecture translation and subtitles

Live lecture captioning should be implemented using Mozilla’s text to speech solution and translation using OpenNMT. The sooner this is piloted, the more data the algorithm has to learn from and the quicker the process will be to adapt it for use at the University.

## Upgrade the classrooms

At the very least ensure that a projector is installed in each of the classrooms as this will immediately allow for a deeper level of engagement with students and less time wasted by writing out notes

## Long term recommendations

## Invest in language experts and software developers

Language experts and software developers can work together to adapt the software to those lecturers at the university and to the languages spoken by all those at the university. This will allow a tailor made experience and will be a first-in-class solution to language barriers in teaching across the world

## Invest in technology for the classroom

Providing a workstation at each desk is one way that all students will be able to interact with online resources live and in the lecture. This will greatly increase engagement and will allow another avenue for learning.

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# References

Mozilla Research. (2018). Machine Learning & Open Source Speech-to-text Engine Development Project. [online] Available at: <https://research.mozilla.org/machine-learning/>

Cloud Translation API - Dynamic Translation | Google Cloud. [online] Available at: <https://cloud.google.com/translate/>.

Opennmt.net. (2018). OpenNMT - Open-Source Neural Machine Translation. [online] Available at: <http://opennmt.net/>

Google Cloud. (2018). Cloud Speech-to-Text - Speech Recognition | Google Cloud. [online] Available at: <https://cloud.google.com/speech-to-text/>

Ldg.uct.ac.za. (2018). About LDG | Language Development Group. [online] Available at: <http://www.ldg.uct.ac.za/ldg/about/work>

Council on Higher Education, (2001). 1st ed. [PDF] LANGUAGE POLICY FRAMEWORK FOR SOUTH AFRICAN HIGHER EDUCATION. Available at: <http://www.dhet.gov.za/HED%20Policies/Language%20Policy%20Framework%20for%20South%20African%20Higher%20Education.pdf>

Interview with The Language Development Group Members Catherine Hutchings and Aditi Hunma. (2018). Carried out by Jethro Moller and Phindile Xulu