



DMISRS M&E Report 2019

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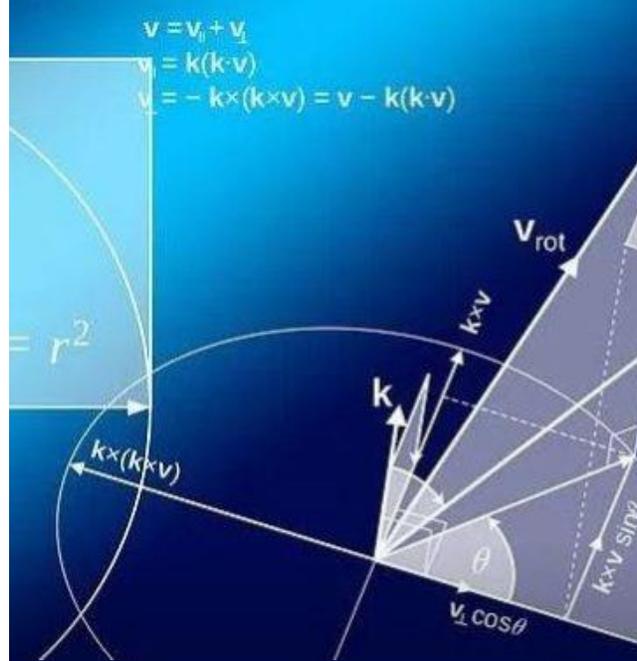


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Introduction

This report summarises the project activities, outputs and participant outcomes of the 2019 Diagnostic Mathematics Information for Student Retention and Success (DMISRS) Project. Intended project activities (surveys, mid-year symposium and Teaching and Learning workshops) were conducted as intended, and were recorded and reported on as per the project's Monitoring and Evaluation (M&E) plan. Project partners from participating Higher Education Institutions (HEIs) consistently provided positive feedback on the project's activities, and made suggestions that have been reflected on by the DMISRS team and incorporated into future planning.

What follows is an introduction to the project and a presentation of key DMISRS activities, as well as the associated outputs and participant outcomes per activity.

The Diagnostic Mathematics Information for Student Retention and Success (DMISRS) Project

The Centre for Educational Testing for Access and Placement (CETAP) submitted a proposal to the Department of Higher Education and Training (DHET) University Capacity Development Programme (UCDP) in 2017 titled "The Diagnostic Mathematics Information for Student Retention and Success (DMISRS) Project". The Principle Investigator, Robert Prince and Operations Manager, Emlyn Balarin of CETAP, were requested to attend a meeting in Pretoria on 18 September 2017 between the CETAP / NBT project, USAF, DHET and DBE. At this meeting the DHET indicated interest in the project but advised that specific budget line items would need to be excluded if the proposal to have a chance of success. The revised project proposal was submitted in 2017 and the adjudication process completed in early 2018, with the successful CETAP project proposal awarded funding for the period 2018 – 2020.

The DMISRS Project Proposal was developed to address the lack of alignment between students' literacy practices and mathematical proficiency, and the academic practices of their chosen disciplines. This gap results in significant attrition, which continues to widen inequality, and impacts the economy and future development (about 40% of all registered students have dropped out of their studies by the end of regulation time, and only 27% obtain their degrees in the regulation time (CHE, 2013)). The project proposal sought to

contribute towards the national imperative to address the problem of high failure and drop-out rates, in STEM programmes, specifically in first year Mathematics courses.

The DMISRS Project focuses specifically on support for students' mathematical needs in higher education and in STEM programmes in particular, given the national imperative. The project aims to analyse the NBT Mathematics scores and Higher Education Management Information System (HEMIS) data sets in order to establish how students' performance in the NBTs correlate with graduation and drop-out rates. It also aims to research the effect of curriculum-integrated support initiatives for Mathematics in the first year of study and initiate the development of blended learning resources aligned with this research. The ability to achieve these aims hinged on the expansion of National Benchmark Tests Project (NBTP) Mathematics (MAT) testing to facilitate the inclusion of an expanded range of South African Universities who would not typically have NBTP MAT data for their registered cohorts, and hence optimise and expand the data available.

Broadly, the project involves the following:

1. Individual areas of need for students in identified institutions are determined through sub-domain analysis of NBT Mathematics results in Year 1;
2. Determining the support for Mathematics that has been available in the past (for example, a hot seat, or tutorial classes) in an at-risk Mathematics course in identified institutions are determined;
3. The inclusion of additional support (for example open educational resource material or other online topic-specific resources mediated by a blended learning specialist) based on what seems to have worked at other institutions will be considered;
4. At the end of Year 1, the results will be scrutinised to determine whether they are better than /same as /worse than before (even though this will be a new student group it should be indicative of the impact of the initiative).

Project Outcomes

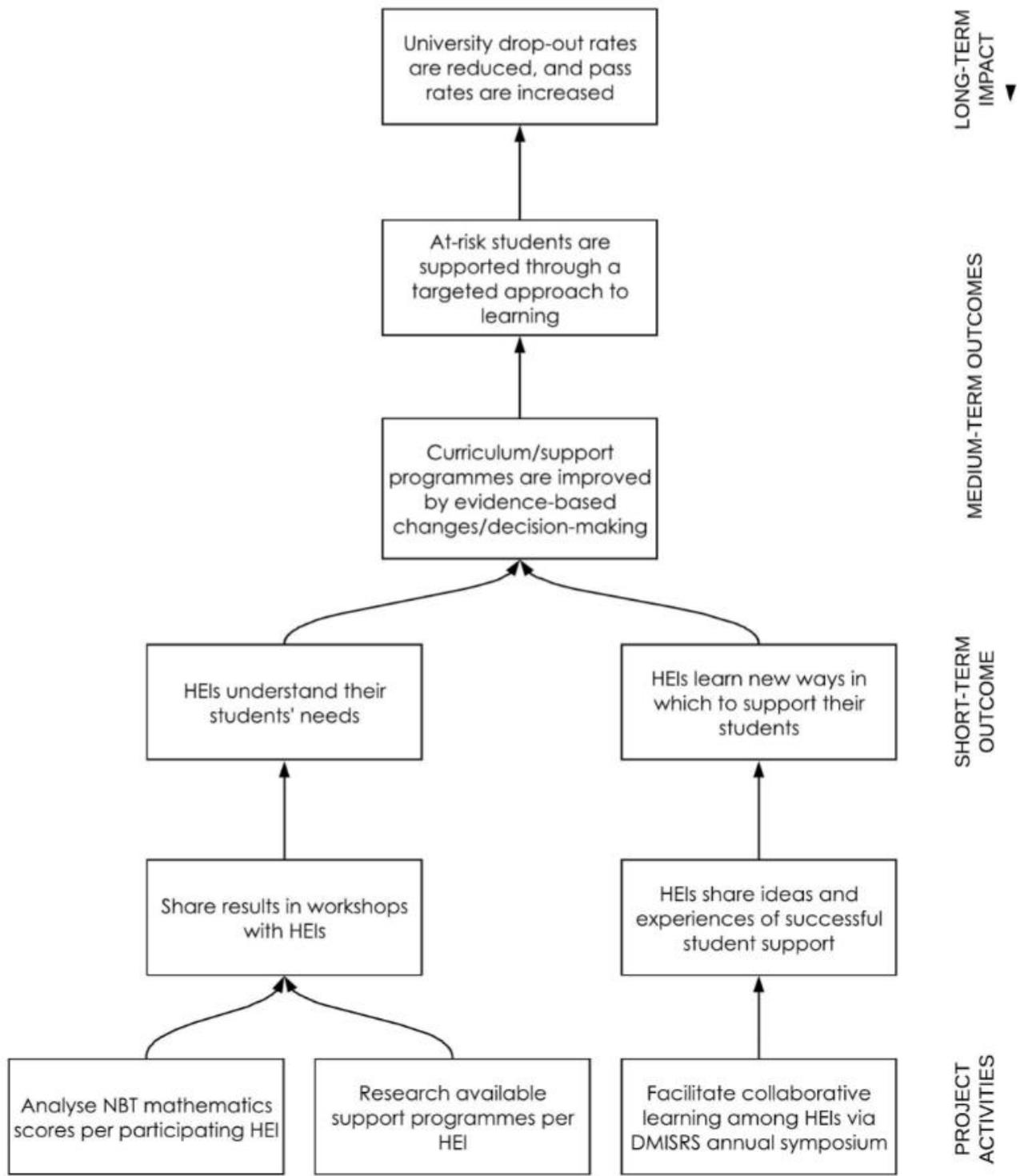
The project's outcomes are best served by a Theory of Change that describes the sequence in which these outcomes are expected to be achieved. A Theory of Change further helps to ensure project activities are aligned with the goals of the project, and guides the outputs

and participant outcomes that should be measured and monitored. A Theory of Change for the DMISRS project was developed in collaboration with the DMISRS team in February, 2019. It is visualized on the following page, and described below.

The Theory of Change begins with the project's primary activities: (1) analyse first-year students' NBT mathematics scores at each of the participating HEIs in relation to their first-year performance, and institutional drop-out and graduation rates; and (2) investigate what curriculum-integrated support programmes are available to these students at each HEI, and what are best practices in this regard. The results of these two investigations are then shared with participating HEIs at annual Teaching and Learning workshops.

As a result of these activities, and direct participation in the annual workshops, HEIs develop an understanding of their students' performance and, consequently, the gaps in their support programmes that fail to address these needs. Using this knowledge, HEIs improve their current student support programmes by using the evidence presented to them in the workshops.

At-risk students are thus better supported by their faculties' revised targeted approach to learning, and, as a result, it is expected that drop-out rates will decrease, and pass/graduation rates will increase.



DMISRS Project Activities

HEI Support Programmes

Between April and June 2019, the DMISRS Project Team administered a survey to HEI partners. Twenty-four respondents completed the survey, from 16 institutions across South Africa. The survey was designed to understand how HEIs currently use the NBTs and what support programmes were being implemented among students at that time. The survey data was analysed and reported on by the M&E team, and the full report was shared with HEI partners at the 2019 DMISRS Symposium (discussed below).

The report can be summarised as follows:

- The majority of universities (88%) do not use the NBT results for student placement, or to identify support needs (75%).
- The implementation of student support interventions differ per HEI according to the respondents. This is summarised below:

Type of Support	Percentage of Respondents
<i>Special sessions</i>	29%
<i>Tutorials</i>	92%
<i>Additional materials</i>	75%
<i>Peer Support</i>	58%
<i>Hot Seats</i>	63%
<i>Lecturer Support</i>	92%
<i>Other (faculty support, maths centre, workshops)</i>	13%

- Half of the respondents reported that their student support services could be improved.

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- Fifty-four percent of respondents said that they need support in order to change their student support services.

The results of this survey demonstrated that the gap the DMISRS project was established to address is real, reinforcing the relevance of the project for improving institutional support services.

DMISRS Symposium

The 2019 DMISRS symposium was held at the University of Cape Town on the 8th and 9th of July. Twenty-eight HEI representatives attended the symposium, from institutions across the country.



The following topics were covered in presentations, panel discussions, and group discussions:

- The status of STEM and the DMISRS project;
- Courses that impede graduation;
- The diagnostic information from the NSC and NBT;
- The academic and quantitative literacy diagnostic information of the current first year Mathematics students;
- Mathematics for science (panel);
- Mathematics for engineering (panel);
- Mathematics for commerce (panel);

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- Mathematics for computer science (case study);
 - The psychological well-being of students;
 - Extended Mathematics Programmes (panel); and
 - Solutions and the way forward.

All presentations and discussions were summarised by the project's M&E team and compiled into a report (available upon request).

At the end of the symposium, participants were asked to complete a short feedback survey. The purpose of the survey was to gauge partners' perceptions of the usefulness of the symposium, whether they intended to apply what they had learned, and how to improve future symposia. Surveys were analysed and written up into a report by the M&E team. Key takeaways include:

- All participants said that they found a discussion/presentation particularly interesting or useful.
- The majority of participants (89%) reported that they intend to use what they had learned at the symposium in their future planning.
- Most participants (75%) offered suggestions for future symposia (e.g. inviting additional stakeholders and specific topics to be covered).

NBT Analyses and Teaching and Learning Workshops

NBT Teaching and Learning Workshops are a fundamental part of the DMISRS project. They involve the implementation of customised workshops with relevant staff at each participating institution. The workshops provide an overview of the project, as well as an analysis of the institution's NBT and sub-domain data. Workshop objectives include:

1. Discussing the relevance of the subdomains to teaching and learning;
2. Providing feedback on student performance (broken down into a national profile, an institutional profile, and departmental cohort); and
3. Facilitating a discussion about the resultant implications for teaching and learning at each institution.

Four workshops were held in 2019, at: Rhodes University (RU), Mangosuthu University of Technology (MUT), University of Zululand (UNIZULU), and Safako Makgatho Health Sciences University (SMU). The workshops were well-attended by staff (see the figure below)

ATTENDANCE

The workshops followed the same general format in line with the objectives described above. The DMISRS team would analyse the NBT data of each institution in advance of the workshop so that the group could discuss the needs and performance of the current student cohort. These needs would then guide discussions around the support mechanisms that may improve student performance. For example, in cases where the data showed decreased levels of quantitative literacy skills, a suggestion made to the group was to use examples in context that are relevant and comprehensible to students, and to discourage rote learning.

Figure 1. Academic Literacy Scores per University.

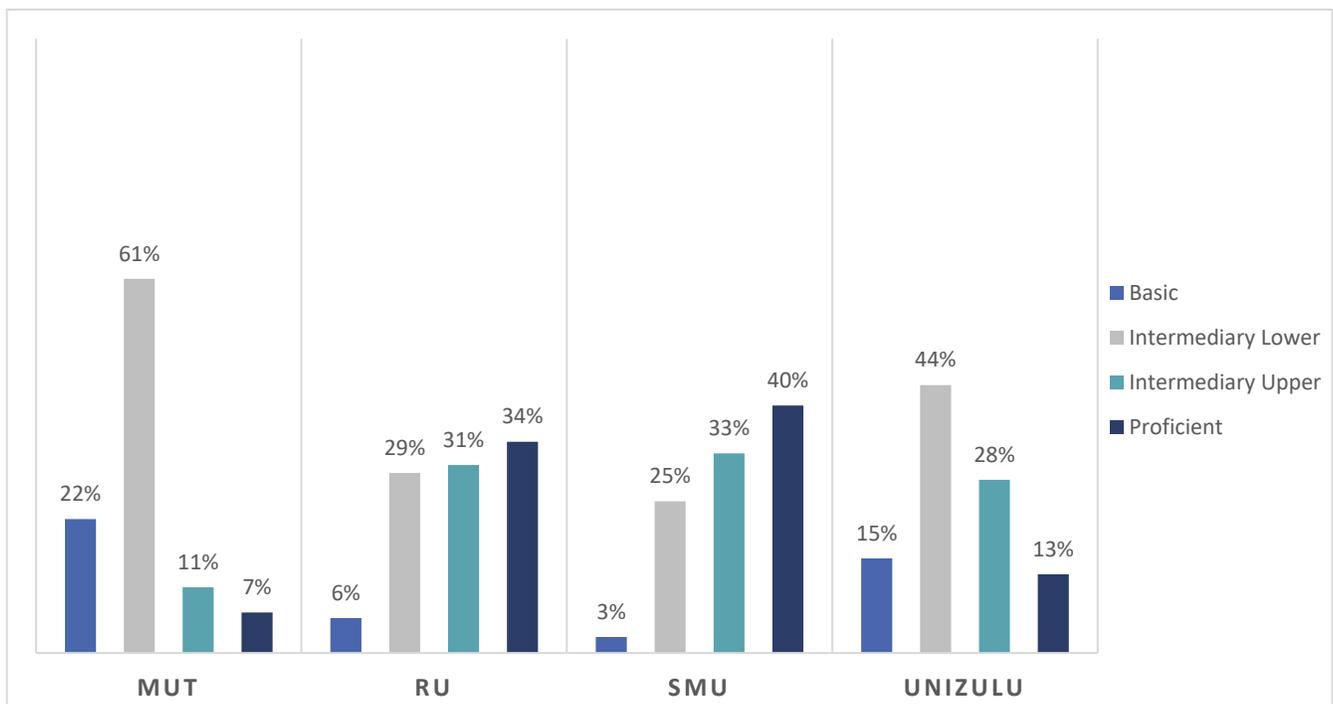


Figure 2. Qualitative Literacy Scores per University.

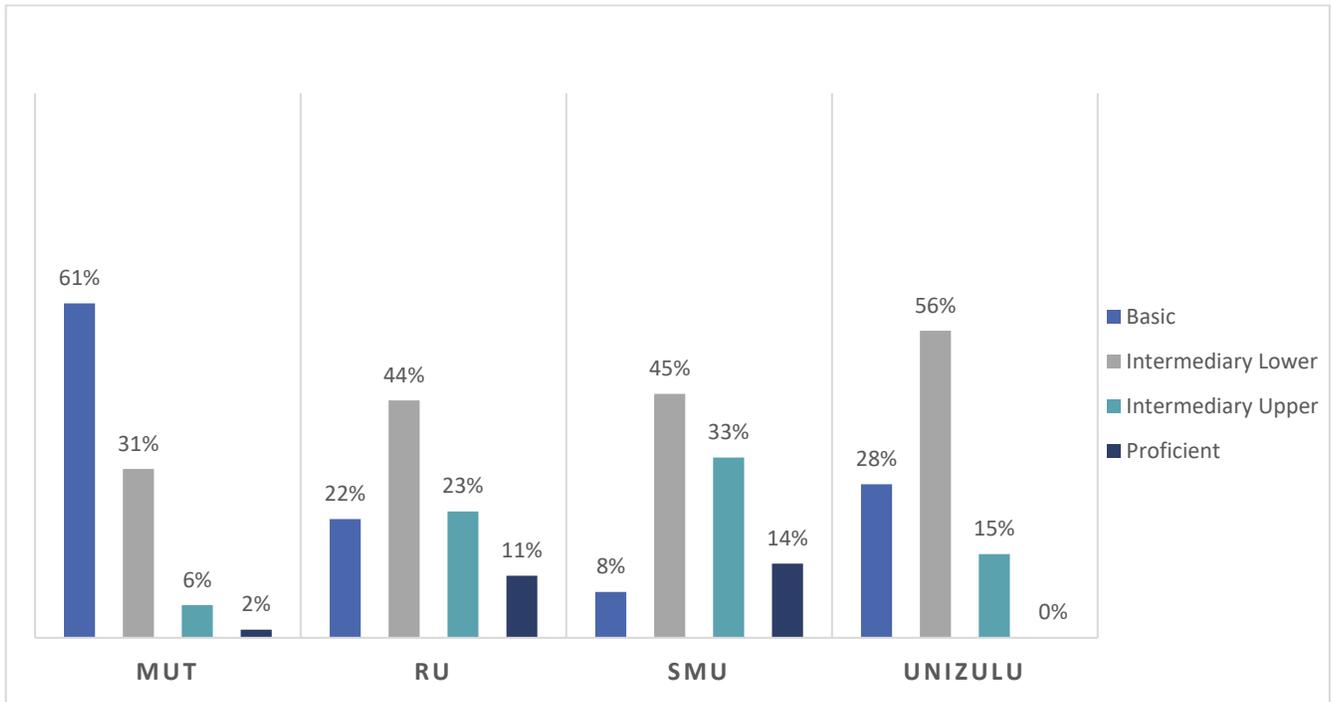
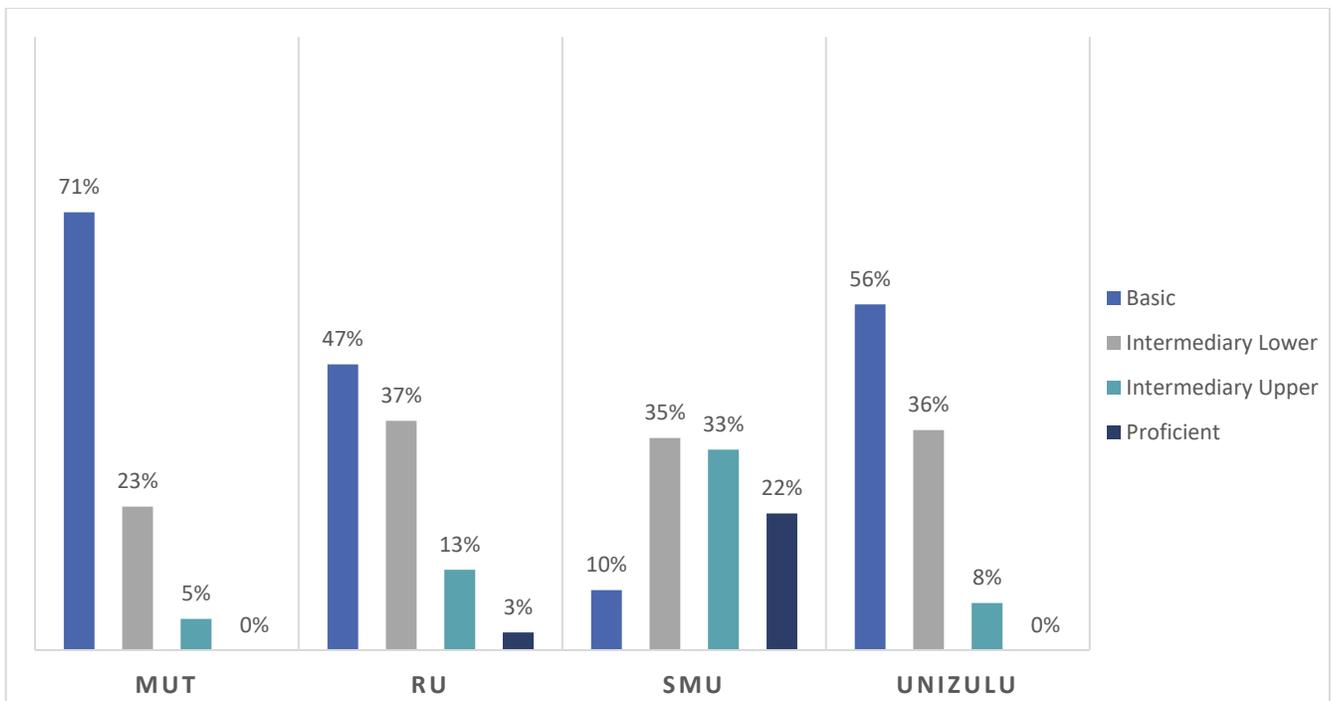


Figure 3. Mathematics Scores per University.



At the end of each workshop, participants were asked to complete a feedback survey to inform the development of future Teaching and Learning workshops. This data, along with a

summary of the workshop content, was compiled into a report by the M&E team for each workshop.

Feedback across all of the workshops has been combined and summarised below:

- **99%** of all workshop participants found a particular discussion or presentation interesting or useful.
- **93%** of participants intended to apply lessons they learned in the workshop in their future planning.
- **64%** of participants felt as though something was missing from the workshop.

Participants were able to make suggestions regarding additional elements that would be beneficial to them in future workshops, for example: how other universities apply NBT results, suggestions on assessing the effectiveness of support efforts, and additional interactive workshop sessions.

Going Forward

Monitoring and evaluation of the DMISRS project and associated activities will continue in 2020. This includes: conducting HEI partner surveys; reporting on Teaching and Learning Workshops; and reporting on the DMISRS Symposium. In addition, new reporting measures will be introduced in order to follow-up on the workshop outcomes from 2019. This will include a follow-up survey to workshop participants, and a student survey in the third or fourth quarter of 2020 (to be decided in accordance with the DMISRS activity plan).

Conclusion

The DMISRS project was implemented properly and according to plan in 2019. All outputs were delivered, correctly recorded and reported on. Feedback gained from HEI partners was carefully considered by the DMISRS team, ensuring that the monitoring system is informing future planning as it was designed to do. Furthermore, partner feedback was consistently positive, indicating the usefulness and relevance of this project to HEIs and their student support efforts.