

ASSESSING AND REPORTING ON THE EFFECTIVENESS OF QUALITY MANAGEMENT SYSTEMS FOR RESEARCH

This section provides guidelines for how an institution can assess the effectiveness of their management systems for research and report to what extent the research activities and processes in the institution are managed, supported and developed in a way that assures and enhances quality, and increases research participation, research productivity and research resources. It describes what information should be gathered as evidence to support claims related to research support and development, research participation, research productivity and research resources, and how this information should be reported on.

The following questions, posed from an institutional perspective, have been used to structure this section:

- * What evidence, related to input, process and output factors,³ can we use to show that all aspects of our research management system have worked or are working effectively?
- * What information do we need to gather to provide this evidence?
- * How should we report on this evidence?

This section elaborates on some of the guidelines provided to institutions in the Institutional Audit Manuals produced by the HEQC. There are two Audit Criteria⁴ which apply to quality-related arrangements for research and one Criterion⁵ that applies to quality-related arrangements for postgraduate education. Looking more closely at these criteria and the expectations related to them, this section lists the measurable expected outcomes of an effective system and discusses each in terms of how it can be assessed, the evidence required for making this assessment and the format of reporting. As far as possible, the suggested tables in this section have been aligned to match data categories required by HEMIS and the R&D survey.

Once again, the tables presented here are not meant to be prescriptive. Before looking at these tables, institutions should first ask themselves: what would we use as measures of quality and how can we best report on research support and development, research participation, research productivity and research resources, in our institution? Only after this should institutions consider whether the tables presented here are useful for their purposes or whether they need to adapt them to suit their needs or create their own reporting tables.

³ Input factors include, for example costs (expenditure) and human resources (current enrolments); process factors include quality management and support and development strategies; and output factors include graduations and publications.

⁴ Criterion 15 and 16; Criterion 15 applies to all institutions and Criterion 16 only to research-intensive institutions.

⁵ Criterion 17

5.1 RESEARCH POLICIES AND/OR PLANS ARE ADEQUATELY RESOURCED

Research resources at an institution include both the financial and the human resources available for research. What needs to be demonstrated here is how resources for research are allocated and distributed across the institution. Resource allocation and distribution is often a good reflection of the extent to which research is prioritised in an institution and the feasibility of effective implementation of research policies and/or plans.

5.1.1 Financial resources

There are various levels of financial resource allocation within an institution that should be assessed. The first level relates to the proportion of the total expenditure of an institution that is spent on research. The second level relates to the overall expenditure and distribution of the research budget within the institution. This includes the proportion spent on running the Research Office, and, if possible, the research expenditure for faculties/schools/programmes or scientific domains. The third level relates to expenditure on certain 'line items' that contribute to research support in the institution. This includes direct support for student and staff research-related activities and allocations for research capacity development programmes, scientific equipment, library services and IT support.

Since institutions structure their budgets differently, the following tables serve as guidelines only, and should be adapted by institutions to report on their financial resource allocation and expenditure for research.

Table 5.1.1 (a): Total research expenditure in thousand rands

YEAR	TOTAL EXPENDITURE ¹	Research & development expenditure ¹		Research office ²	Research and innovation office ³
		Total exp.	% of Total exp.	Total exp.	Total exp.
2002					
2003					
2004					

Notes:

1. As reported in the R&D Survey
2. Sometimes called 'Research Administration Office'. This column refers to this office's expenditure only and includes its salaries and running costs.
3. If this office is different to the 'Research Office', then expenditure must be reported separately.

Table 5.1.1 (b): Research support expenditure¹ in thousand rands

EXPENDITURE CATEGORY	2002	2003	2004	For each category give typical examples of what has been included here
<i>Scientific equipment</i>				
<i>Library services</i>				
<i>IT support</i>				
<i>Student support for research²</i>				e.g. grants, scholarships, bursaries, conference attendance
<i>Staff support for research²</i>				e.g. conference attendance, publication page fees
<i>Research capacity</i>				
<i>Development & support programmes²</i>				
<i>Other (Specify)</i>				

Notes:

1. This table is NOT a breakdown of the total expenditure, so the total does not have to add up to the previous total. This table is helpful for assessing shifts in expenditure priorities in key areas related to research support.
2. These refer to expenditure derived from internal funds only, i.e. not donor or agency funding.

5.1.2 Human resources

Time devoted to research by academic/research staff is often regarded as the best indicator of the research capacity of the institution. Again there are different levels of research capacity that need to be assessed.

The first level relates to the number of academic staff as a proportion of the total staff at the institution. The second level relates to the profile of academic staff by rank, qualification and current enrolments in postgraduate studies. The latter should ideally be reported per faculty over time.

Since issues of redress and equity should be taken into account in the assessment of human resources, these figures should all be reported by race and gender.

The following tables can be used and adapted by institutions to report on their human resource capacity for research.

Table 5.1.2 (a): Total academic staff¹ (Headcounts)

	TOTAL STAFF									ACADEMIC STAFF								% of total staff	
	A		C		I		W		Total	A		C		I		W			Total
	F	M	F	M	F	M	F	M		F	M	F	M	F	M	F	M		
2002																			
2003																			
2004																			

Notes:

1. Referred to as 'permanent research/instruction staff' in HEMIS Table 3.3

Table 5.1.2 (b) Profile of academic staff by rank

RANK	FACULTY 1¹									
	A		C		I		W		Total	
	F	M	F	M	F	M	F	M	F	M
Junior lecturer										
Lecturer										
Senior lecturer										
Professor										
Total										

Notes:

1. This information should be repeated for Faculty 2, Faculty 3 etc.

Table 5.1.2 (c): Profile of academic staff by qualification

HIGHEST² QUALIFICATION	FACULTY 1¹									
	A		C		I		W		Total	
	F	M	F	M	F	M	F	M	F	M
Under-graduate degree										
Honours										
Master's										
Doctorate										
Total										

Notes:

1. This information should be repeated for Faculty 2, Faculty 3 etc.
2. Refers to qualification held in year of reporting.
3. In the case of the ex-technikons, honours includes BTech.

Table 5.1.2 (d) Profile of academic staff by current studies

<i>DEGREE</i>	<i>FACULTY 1¹</i>								<i>Total</i>
	<i>A</i>		<i>C</i>		<i>I</i>		<i>W</i>		
	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	
<i>Under-graduate degree</i>									
<i>Honours³</i>									
<i>Master's</i>									
<i>Doctorate</i>									
<i>Total</i>									

Notes:

1. This information should be repeated for Faculty 2, Faculty 3 etc.
2. In the case of the ex-technikons, honours includes BTech.

5.2 RESEARCH POLICIES AND/OR PLANS ARE CONSISTENTLY IMPLEMENTED AND MONITORED

One of the best ways to assess the implementation of research policies and plans is to look at the outcomes or results of this implementation. Hence, we have to assume that any increase in research participation, output and funding is evidence of the effective implementation of the institution's research policies and/or plans. To demonstrate any increase one obviously has to report on data over time.

5.2.1 Research participation

Here, the levels of research capacity described under 5.1.2 need to be reported over time. Tables 5.1.2 (a–c) above can be used, if reporting over time, to show whether there have been increases in the proportions of academic staff, and whether the profiles of the academic staff have changed with respect to rank and qualifications. Tables 5.2.1 (a) and 5.2.1 (b) below can be used to show whether there have been increases in the number of postgraduate student enrolments per faculty compared to undergraduates. All these tables will also show whether there have been increases in the number of women and black research staff and postgraduate students participating in research over the previous three years.

Three additional levels of research participation can be assessed. The first relates to the proportion of staff applying for NRF ratings and how many succeed in getting a rating, the second to the proportion of staff applying for funding and their success rates, and the third to numbers of postdoctoral fellows and visiting researchers.

The following tables can be used and adapted by institutions to show increases in the number of postgraduate students per faculty, success rates for NRF ratings, success rates for funding, and participation of postdoctoral fellows and visiting researchers.

Table 5.2.1 (a) Total postgraduate and undergraduate student enrolments by faculty, race and gender over time

	FACULTY 1 ¹ (2002)								Total	FACULTY 1 (2003)								Total	
	A		C		I		W			A	C		I		W				
	F	M	F	M	F	M	F	M		F	M	F	M	F	M				
Under-graduate students																			
Post-graduate students²																			
Total																			
PG/T																			

Notes:

1. This information should be repeated for Faculty 2, Faculty 3 etc.
2. This includes honours, master's and PhD students; at the ex-technikons, this also includes BTech students.

Table 5.2.1 (b) Postgraduate student enrolments by level, faculty, race and gender over time

	FACULTY 1 ¹ (2002)								Total	FACULTY 1 (2003)								Total	
	A		C		I		W			A	C		I		W				
	F	M	F	M	F	M	F	M		F	M	F	M	F	M				
Honours²																			
Master's																			
PhD																			
Total																			

Notes:

1. This information should be repeated for Faculty 2, Faculty 3 etc.
2. In the case of the ex-technikons, honours includes BTech.

Table 5.2.1 (c) NRF Ratings – per faculty by gender and race

	<i>FACULTY 1¹ (2002)</i>					<i>FACULTY 1 (2003)</i>					<i>FACULTY 1 (2004)</i>														
	<i>A</i>		<i>C</i>		<i>I</i>	<i>W</i>		<i>Total</i>	<i>A</i>		<i>C</i>		<i>I</i>	<i>W</i>		<i>Total</i>	<i>A</i>		<i>C</i>		<i>I</i>	<i>W</i>		<i>Total</i>	
	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>		<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>		<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	
<i>A-Rated</i>																									
<i>B-Rated</i>																									
<i>C-Rated</i>																									
<i>P-Rated</i>																									
<i>Y-Rated</i>																									
<i>L-Rated</i>																									
<i>Total rated (TR)</i>																									
<i>Number of applications (AP)</i>																									
<i>TR/AP</i>																									

Notes:

1. This information should be repeated for Faculty 2, Faculty 3 etc.

Table 5.2.1 (d) Success rates for funding applications for staff and students¹

INTERNAL FUNDS

	<i>Applications</i>					<i>Awards²</i>					<i>Success rate (Tot app/Tot aw)</i>														
	<i>A</i>		<i>C</i>		<i>I</i>	<i>W</i>		<i>Total app</i>	<i>A</i>			<i>C</i>		<i>I</i>	<i>W</i>		<i>Total aw</i>								
	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>		<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>								
<i>Staff</i>																									
<i>Post-graduate research students³</i>																									

EXTERNAL FUNDS: NATIONAL RESEARCH AGENCIES

	<i>Applications</i>					<i>Awards²</i>					<i>Success Rate (Tot app/Tot aw)</i>														
	<i>A</i>		<i>C</i>		<i>I</i>	<i>W</i>		<i>Total app</i>	<i>A</i>			<i>C</i>		<i>I</i>	<i>W</i>		<i>Total aw</i>								
	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>		<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>								
<i>Staff</i>																									
<i>Post-graduate research students³</i>																									

Notes:

1. Information should be submitted for the previous three years.

2. Refers to awards granted on submission of research proposals.
3. This includes honours, master's and PhD students who apply for research funding; at the ex-technikons, this also includes BTech students.

Table 5.2.1 (e) Postdoctoral fellows and visiting researchers

	FACULTY 1 ¹ (2002)								Total	FACULTY 1 (2003)										
	Country of origin	A		C		I		W		Country of origin	A		C		I		W		Total	
		F	M	F	M	F	M	F			M	F	M	F	M	F	M	F		M
Postdoctoral fellows²	1.										1.									
	2.										2.									
	3. etc.										3. etc.									
Visiting researchers³	1.										1.									
	2.										2.									
	3. etc.										3. etc.									

Notes:

1. Information should be submitted for the previous three years and repeated for Faculty 2, Faculty 3 etc.
2. This refers to researchers appointed as postdoctoral fellows within a faculty, whether South African or non-South African.
3. This refers to researchers hosted by the faculty for extended periods, from two weeks or more.

5.2.2 Research outputs⁶

The primary measures of research outputs in higher education institutions are research publications, patents and non-textual outputs (artefacts, performances, designs) and graduations of postgraduate students.

5.2.2.1 Publications, reports, patents and non-textual outputs

There are various categories of publications that can be reported on. These include articles in SAPSE accredited journals, books/monographs, chapters in books, published conference proceedings and contract research reports. To get a sense of productivity across the institution, publication, patent and non-textual output data should be reported per faculty/school and per gender and race of authors. Again, to measure any increase, this data should be reported over time. The following table can be used and adapted by institutions to report on their publication, patent and non-textual output data for the previous three years.

⁶ See Appendix C for definitions of recognised research outputs by the Ministry of Education.

Table 5.2.2.1 Publications, reports, patents and non-textual outputs – per faculty by race and gender

	<i>FACULTY 1¹ (2002)</i>								<i>FACULTY 1 (2003)</i>								<i>FACULTY 1 (2004)</i>										
	<i>A</i>		<i>C</i>		<i>I</i>		<i>W</i>		<i>Total</i>	<i>A</i>		<i>C</i>		<i>I</i>		<i>W</i>		<i>Total</i>	<i>A</i>		<i>C</i>		<i>I</i>		<i>W</i>		<i>Total</i>
	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>		<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>		<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	
<i>Books / Monographs</i>																											
<i>Chapters in books</i>																											
<i>Articles in accredited journals²</i>																											
<i>Articles in non-accredited journals</i>																											
<i>Published conference proceedings</i>																											
<i>Contract research reports³</i>																											
<i>Patents⁴</i>																											
<i>Non-textual outputs (Specify)⁴</i>																											

Notes:

1. This information should be repeated for Faculty 2, Faculty 3 etc.
2. Consult the DoE list of accredited journals.
3. Refers to research reports submitted to a contracting agency and not published elsewhere under the author's name
4. See definitions of patents and non-textual outputs in Chapter 3.

5.2.2.2 Postgraduate graduations

Graduation rates for honours, master's and doctorates should be reported per faculty and per race and gender of students over time. This will show to what extent the postgraduate output has increased per faculty.

The following table can be used and adapted by institutions to report on their postgraduate graduations for the previous three years.

Table 5.2.2.2 Postgraduate graduations – by level and per faculty by race and gender

	FACULTY 1 ¹ (2002)					FACULTY 1 (2003)					FACULTY 1 (2004)									
	A		C		I	W		Total	A		C		I	W		Total				
	F	M	F	M		F	M		F	M	F	M		F	M					
Honours²																				
Master's																				
PhD																				
TOTAL																				

Notes:

1. This information should be repeated for Faculty 2, Faculty 3 etc.
2. In the case of the ex-technikons, honours includes BTech.

5.2.3 Research funding

The research expenditure reported under 5.1.1. will give an indication of trends in research expenditure over time. In addition, an institution should report on its sources of funding for research for the previous three years. These sources should include internal funds, national funding agencies, industry or foreign donors.

The following table can be used and adapted by institutions to report on their external sources of research funding for the previous three years.

Table 5.2.3 Sources of funding in rands

	UNIVERSITY RESEARCH FUNDS¹	NATIONAL FUNDING AGENCIES²					FOREIGN DONORS²	INDUSTRY²	OTHER	TOTAL
		NRF	THRIP	MRC	ARC	WRC	<i>Specify</i>	<i>Specify</i>	<i>Specify</i>	
2002										
2003										
2004										

Notes:

1. This refers to the amount of the institution's budget committed to research for each year.
2. This refers to the actual amount received for research from these agencies and donors for each year.

5.2.4 Monitoring research policies or plans

It is important for an institution to be able to show that it consistently monitors the implementation of its research policies and plans. Evidence of monitoring research policies would be policy review reports, conducted internally or by an external agent, as well as records of policy decisions made by research committees or senate, based on the reviews of policies.

The following form can be used and adapted by institutions to report on policy monitoring and review processes. Any review documents should also be submitted.

Form 5.2.4 Monitoring and reviewing research policies

POLICY NAME	IMPLEMENTATION DATE	REVIEW DATE		COMMENTS ON MAJOR CHANGES BASED ON POLICY REVIEW
		<i>Internal review – date</i>	<i>External review – date</i>	

5.3 STRUCTURES AND MECHANISMS FOR THE QUALITY ASSURANCE OF RESEARCH FUNCTION EFFECTIVELY (FOR RESEARCH-INTENSIVE INSTITUTIONS ONLY)

There are two levels at which the effective functioning of research quality assurance structures and mechanisms can be assessed. The first level is the location of the structure within the institution and its composition. This will show whether the structures and mechanisms are appropriately placed and have the necessary authority and expertise to support the achievement of the research policy objectives and strategic targets. The second level of assessment relates to the actual functioning of these structures or mechanisms. This would include the frequency of meetings, the actual briefs given to these structures and the criteria they use to perform their functions.

To report on the first level, an organogram should be drawn up, showing the location of the research management structures within the institution and who serves on these structures. To report on the second level, the following form can be used and adapted by institutions to report on the functioning of these structures.

Form 5.3 Mechanisms and structures for research quality assurance

<i>STRUCTURE/ MECHANISM</i>	<i>PARTICIPANTS</i>	<i>FREQUENCY OF MEETINGS</i>	<i>BRIEF</i>	<i>CRITERIA APPLIED</i>

5.4 STRATEGIES FOR RESEARCH SUPPORT AND DEVELOPMENT, INCLUDING CAPACITY DEVELOPMENT, ARE EFFECTIVELY IMPLEMENTED AND MONITORED

To assess the effectiveness of research support and development strategies, an institution has to report on the budget allocated to these strategies, as well as participation rates, success rates and performance indicators, depending on the nature of the strategy. For example, if the nature of support is financial, an institution should report on the success rates of applications for research funds. If it is a research support and development programme or initiative, an institution should report on the focus of the programme, the number and demographics of participants, and performance indicators that have been used to measure the impact of the programme on individuals.

The following tables can be used and adapted by institutions to report on the budget, success rates, participation rates and performance indicators related to strategies for research support and development.

Table 5.4 (a) Research support and development for staff

ACTIVITIES	DATE	ATTENDANCE								PERFORMANCE INDICATORS	
		A		C		I		W			Total
		F	M	F	M	F	M	F	M		
Conference attendance											
Exchange programmes											
Staff development workshops											
Etc.											

Table 5.4 (b) Research support and development for postgraduate education⁷

ACTIVITIES	DATE	ATTENDANCE								PERFORMANCE INDICATORS	
		A		C		I		W			Total
		F	M	F	M	F	M	F	M		
Conference attendance											
Exchange programmes											
Staff development workshops											
Etc.											

5.5 AN EFFICIENT AND COMPREHENSIVE RESEARCH INFORMATION SYSTEM HAS BEEN EFFECTIVELY USED FOR PLANNING AND EXTERNAL REPORTING

The effectiveness and efficiency of an institution’s research information system can be assessed by considering how the system is being used by the institution. This includes reporting on how often information is updated, how often information is retrieved, by whom and for what purpose. For example, an institution should report on when information has been used for internal planning or dissemination purposes and when it has been used for external reporting on the research capacity or performance of the institution. If the information captured in this system is infrequently used by the institution then it has to be assumed that the institution has a research information system that is inefficient and not comprehensive.

⁷ This refers to research honours, master’s and doctoral programmes.

The following form can be used and adapted by institutions to report on their research and information system.

Form 5.5 Use of research information system

<i>DATE OF RETRIEVAL</i>	<i>PURPOSE</i>	<i>REQUESTED BY WHOM</i>

5.6 MECHANISMS AND STRATEGIES FOR THE QUALITY ASSURANCE, SUPPORT AND DEVELOPMENT OF POSTGRADUATE EDUCATION HAVE BEEN EFFECTIVELY IMPLEMENTED AND MONITORED

We assume that the participation rates of postgraduate students will have been reported under 5.2.1, graduation rates under 5.2.2.2, structures and mechanisms for quality assurance and monitoring of postgraduate education under 5.3 and support and development strategies for postgraduate education under 5.4 (b). Reporting on postgraduate education in these categories allows one to assess whether an institution pays adequate attention to postgraduate education as part of its research quality management system.

In addition to the above, there are at least two more aspects related to postgraduate education that should be assessed. The first is the relationship between supervisors and students⁸ and the second is the research output by postgraduate students.

5.6.1 Supervisors and students

There are two levels at which this relationship can be assessed. The first is the ratio of supervisors to research students per faculty. This ratio gives a good indication of the potential support that postgraduate students can receive within a faculty. The second is a more qualitative assessment that includes the frequency of meetings between students and supervisors and the nature of these meetings. For example, supervisors and students could meet more frequently at the start of a project, to conceptualise and plan the research, or meetings could become more frequent at the analysis stage of the project or at the writing-up stage of the project. Supervisors could give students written feedback or only verbal feedback. An institution should report on a sample of practices from a variety of faculties.

The following table can be used and adapted by institutions to report on the ratio of supervisors to students per faculty.

⁸ This refers only to research honours, master's and doctoral students.

Table 5.6.1 Ratio of supervisors to research students

	<i>Honours¹ students (H stud)</i>	<i>Honours supervisors (H sup)</i>	<i>Ratio (H stud/ M sup)</i>	<i>Master's¹ students (M stud)</i>	<i>Master's supervisors (M sup)</i>	<i>Ratio (M stud/ M sup)</i>	<i>PhD students (P stud)</i>	<i>PhD supervisors (P sup)</i>	<i>Ratio (P stud/ P sup)</i>
<i>Faculty 1</i>									
<i>Faculty 2</i>									
<i>Faculty 3</i>									
<i>Etc.</i>									

Notes:

1. This refers only to research honours and master's students.

5.6.2 Postgraduate research output

An institution should report here on the number and nature of publications and conference presentations by postgraduate students. This includes publications that are co-authored with supervisors or other research students and joint conference presentations. Again, this information should be reported per faculty. The following table can be used and adapted by institutions to report on postgraduate research output.

Table 5.6.2 Research outputs by postgraduate students

	<i>FACULTY 1</i>		<i>FACULTY 2</i>		<i>FACULTY 3 ETC.</i>	
	<i>Total</i>	<i>How many single authored?</i>	<i>Total</i>	<i>How many single authored?</i>	<i>Total</i>	<i>How many single authored?</i>
<i>Articles in accredited journals¹</i>						
<i>Articles in non-accredited journals¹</i>						
<i>Published conference proceedings</i>						
<i>Patents²</i>						
<i>Non-textual outputs²</i>						
<i>Other:</i>						

Notes:

1. Consult the DoE list of accredited journals.
2. See definitions of patents and non-textual outputs in Chapter 3.