CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The conception of this study was a culmination of personal experience and progressive reflection on my own practice and those of colleagues, as well as shared views in various interactive forums. In its development and undertaking the study has revealed a number of outcomes or avenues that conceptualise its impact on the consumer of the study. It is illuminative in that it attempts to highlight both the predominant utterances and the undertones of a shared activity by the very participants in their own voices. It is also an explorative undertaking, traversing new conceptual terrains by raising issues that arise out of simplistic questions posed in a variety of dimensions for any interested persons to decide what they need to do. After all, quality practice results mainly from introspection. The usefulness of this study is that it informs the university under case study as well as other similar universities, particularly those that participated in providing information for the study. In this closing chapter I put all the pieces together, draw conclusions and lay on the table my own insight into the way forward. I start by summarising the conceptions, procedures and the findings of the study presented in the previous chapters.

6.2 Summary of the research process

The study was conceived to address the key question: *How does industry-based learning enhance quality academic practices and relevance to national needs of Zimbabwe?* This question was posed in the backdrop of a pioneering pedagogy adopted by the National University of Science and Technology (NUST) at its inception almost two decades ago in which the university dedicated a full year to deploying students into discipline-related workplaces as an integral part of their degree studies. This industry-based learning pedagogy, termed 'industrial attachment' by the founding university, exists in some universities in other countries of the world as described in the literature, albeit in different formats. Because the pedagogy is central to all the university's degree programmes, it has an impact on the academic practices such as curriculum development, teaching and assessment. And because it takes place outside the university's physical confines in autonomous workplaces, the question of its relevance out there and ultimately to the nation arises. These two aspects are linked together by the prerequisite for quality. For the sake of the discourse the key question was divided into sub-questions that seek specific information from different respondents pertaining to different themes. The

rationale for asking the question and sub-questions was when, a few years down the road, other new universities coming onto the scene began adopting the very same pedagogy

The theoretical framework, informed by the literature, situates industry-based learning in the realm of learning and teaching theory, learning experience, community development, university-community partnerships, the university mission and research for practice. The bulk of the supporting literature underscores the gains made in using tested theory to enrich teaching and learning experiences in outward-looking universities that had their surrounding communities in mind when designing their programmes.

The research design and methods of obtaining data that addressed the research question are the concurrent embedded design of the mixed methods approach in which both qualitative and quantitative data was collected and analysed simultaneously. The method of case study was applied because central issues raised were concerned with one institution from which most of the data was collected. The population consisted of management and lecturing staff at the university, supervisory staff in industry and selected management and lecturing staff from other universities. The data collection techniques were interviews and questionnaires. The response rates from samples were not overwhelming but were encouraging and sufficient to deduce trustworthy findings. Qualitative data from interviews and from open-ended questions in the questionnaires was analysed using thematic content analysis, while quantitative questionnaire data was analysed statistically using computer software and by enlisting the assistance of university-appointed statisticians.

The findings, their analysis and their interpretations are discussed in the section below in relation to the research questions and sub-questions. It is prudent to point out that the findings of this study shape and consolidate what I have learned from my own professional experience as a teacher and lecturer, what I have learned from reading the literature, and from engaging in scholarly discourse with other academic authorities. In particular, the study has pointed to the importance of a match between theory and practice in learning in higher education, and that this enhances the quality of the learning. Part of my learning has resulted in my constructing patterns and relationships between theoretical and practical learning approaches as presented later in Figure 6.1.

6.3 Reflections on Research Questions and Findings

This section reflects on whether the research and its findings answer the stated questions and sub-questions, and to what extent, pointing out what may be missing or lacking. The title of this thesis and the key research question bear two key terms: quality in academic practices, and integrated workplace-based learning. Both will be unpacked in the discussion that follows.

6.3.1 The nature and quality of academic practices

The question addressing this major theme was: *What understandings do participating students, lecturers and industry supervisors wield on the nature and quality of academic practices realised through industry-based learning at NUST?* In various verbal depictions of their internalised understanding of the notion of quality, the three categories of respondents had the expected view of excellence couched in terms such as 'correct procedures', 'high standards', 'scores', 'matching theory with practice', 'learning for real life', et cetera. For the more adult lecturers and university management staff, there was much description of quality as something out there, rather than a personal attribute first and foremost. Respondents could realise and visualise quality in processes and outcomes.

There was also much confidence among many that quality was attained and attainable in the practices that took place in the conduct of industry-based learning. For instance, the belief that quality graduates were produced was aired persistently and confidently by respondents, some supporting it with claims that some graduates easily got employed anywhere in the world, while others got places in foreign universities to further their studies. Whether the mentioned successes were not affected by other factors such as past history, country comparisons, et cetera. was not probed further. Yet one could argue that such certainty had to be supported by empirical evidence. Bouge and Hall's (2003:9) idea that 'Quality is conformance to mission specification and goal achievement – within publicly accepted standards of accountability and integrity' was barely alluded to in the descriptions of staff respondents. Also missing was the perception of quality from a personal experience point of view. On their part, students were more conservative about their perception of quality. For instance, among many revelations they viewed the industry-based learning experiences less useful in preparing for their final year project than their lecturers did, and they were very clear that student

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welfare was not handled qualitatively enough for their comfort. In a nutshell, lecturers and industry supervisors viewed the NUST brand of industry-based learning as significant in enhancing quality academic practices in university teaching and learning, while the students thought less so. The limited opinions on and the admission of reduced activity in research by lecturers reduced the strength of opinions on research-driven learning and learning-focused research and development (R&D) driven by the current industry-based learning format as an effective university service.

6.3.2 The pedagogy and its perceived relevance

The research question put forward was: *How do the views of participants inform analysis of the local relevance and impact of value-added university education on national socio-economic development?* Universities and industry have various platforms of their partnership and collaboration in action, such as the formal and informal levels of relationships alluded to earlier by Ebong (2004). But none, in my view, is as persistent and penetrating as a full-year industrial attachment arrangement year on year, with the student in the middle between the university and the organisation, perhaps asking questions such as, 'Who is the stronger boss?' The industry-based learning pedagogy appears to be onerous on both the university and the organisation on one hand, yet also beneficial on the other, because the student has to meet requirements of both at the same time. What keeps the relationship going is perhaps the perception of mutual relevance that promises chances for both stability and creativity.

It has been repeatedly stated in the earlier chapters that industry-based learning should be relevant to the participants, particularly the students. Their immediate personal needs are cognitive, social, psychological and emotional. On a wider scale feature contribution and cooperation in the affairs of others, coupled with concerns for the future such as anticipations, ambitions, development. On a national level graduates should be able to participate in fixing their economic and industrial potential by engaging in all levels of the economy rather than leaving it to others, much like the shoe trader who does not wear the shoes he sells to others.

6.3.3 Shared conceptions and visions

The question posed is: *How do sentiments shared between NUST and other Zimbabwean universities engaged in industry-based learning indicate their awareness of quality*

practices and the importance of a needs-based and responsive higher education? In the findings and their analysis I explained in some depth the views of universities other the case that is being studied, and it was apparent that there were huge areas of overlap in conceptualisations of practice and aspirations.

One area of consensus among universities is the value added to learning and curriculum development processes and to teaching and learning that flows from industry-based learning. In practice it is difficult to reach a goal if one does not have one. Goal-setting informed by the mission of the university and considering the relevance of any action taken are seen as a virtue. Assimilation into the culture of industrialisation is encouraged, and although the one year period was viewed as convenient and effective, a lifelong learning approach would be more effective.

6.4 Summary of issues emerging from findings

The discussion linking research questions and findings in section 6.3 above has touched on some of the key wisdoms emerging from the study as a whole. It is useful to bring out a summary of these wisdoms in relation to other perceived breakthroughs that inform the academic community about quality concerns in workplace-based learning in higher education institutions. By and large, the findings of this study confirm much of the expressed notions of quality in higher education portrayed in the literature and in practice, such as that industry-based learning in itself is not faulty, but that the people and the methods of applying it may be faulty. Furthermore, some pertinent refinements to the traditionally held definitions of quality indicators emerge, and the task of the university is to access such refinements and select for application appropriately.

6.4.1 Quality is relative but unmistakable

The conception that quality is both a personalised and a publicly shared and contested phenomenon provides explanations for its importance in the development agenda. At the individual level, educational management, practitioners, learners and industry staff, keen to develop their personal professional strongholds, may display and even insist on adhering to narrow views of quality based on limited experiences and specific geographical or situational environments. This, however, does not erase or diminish the value and import of quality when it manifests itself as either a deliberate effort or an accidental encounter in educational undertakings. It would be unconceivable to write-off

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the value to learning achieved through industry-based learning without proffering a credible alternative, especially for developing country universities and other related higher education institutions (HEIs). Thus when a quality enhancing process is publicly conceived and deployed, both sceptics and advocates are seen to twitch. The public contestations of quality fuel both competition and collaboration because development-oriented minds converge around quality.

6.4.2 Industry-based learning has the ingredients for quality practice

Within the operational policies, programmes and academic regulations of every HEI lie its projections and insights into tackling challenges to its mission and vision. The task of producing relevant and responsive human power for a country with developmental challenges calls for universities to search for genuine opportunities to accomplish much from very little. The findings in the study that graduates with industry-based learning experience have competitive advantage over their counterparts without, and are accepted for work engagements anywhere around the world, speaks well of a practice that promotes satisfaction in its participants, a sign of the presence of quality constructivist learning.

6.4.3 Institutional approaches determine adherence to a quality culture

When individuals and organisations discover the value and excitement of sustainably associating with quality, it is not easy to let go. In essence, practice of quality becomes an addictive occupation because those dealing with it enjoy some elevated status which is not easily accessible to all and sundry. This is because the practice of quality is not an easy layman task. It requires substantial effort, time, commitment and resources. For an institution to subscribe to the quality movement, its approaches to academic practice must embrace the concepts of relevance, responsiveness and flexibility discussed earlier. As such, aspects such as preparation of students before going out to workplaces, and induction of new lecturers before they are assigned to assess students should be addressed at department, faculty and institutional levels. The uniformity of documents used in the whole exercise is important.

6.4.4 The university-industry relationship

The model of university-community engagement (HEQC, 2006) discussed in section 2.3 acknowledged the place of service-learning among the key contributions of partnerships to holistic learning and teaching. This study has found cracks in the relationships of some of the players in the discharge of the service learning function by the university under study. The most significant of these cracks exist between university staff and industry staff. Students in particular, as the middle persons in the matrix, expressed their discomfort with the knowledge and operational distance between their supposed mentors on opposite ends of the university-industry partnership. This does not auger well for high-level quality practice. Furthermore, the paucity of collaboration in the area of research and development projects and joint inquiry into practice undermines the quest for knowledge that should inform all partners for ease of fulfilling needs and expectations of learning organisations. Instead, petty tensions are tolerated and avoidable crises painstakingly managed at great cost to people and the organisations in the partnership.

So, while the university-industry relationship was seen to work sufficiently smoothly in terms of administration and continuity from year to year and from one student group to another, the quality of participant interactions needed a second look. It was, for instance, not sound quality thinking to doubt the abilities of industry supervisors to assess students objectively in the workplaces, and do nothing about it from year to year. The negative socio-economic climate prevailing at the time could stand to blame for lack of resources to institute correctional measures, but commitment to correction needed to be strongly voiced. In the final analysis, the university-industry relationship requires much support since without it the industry-based learning cannot work successfully.

6.5 Implications of the study

Recognition of the key issues emerging from the findings of the study assists participants to take into consideration the implications for future planning and practice, policy direction and possibilities extension of research to inform institutional operations and to create appropriate knowledge to drive those operations.

6.5.1 Policy and practice

The relative nature of perception of quality invites university management to consider increasing professional development programmes and strategies that would bring students, university staff, and industry partners to increase knowledge sharing among them and to debate and negotiate the desirable notions of quality in the industry-based learning pedagogy. The lack of adequate communication between university academic staff and industry-based supervisors suggests a need for publications and discussion forums at convenient stages of the process. Monitoring mechanisms and ways of assessing the perception gaps would pre-empt disputes between participants and promote dialogue instead. Such monitoring instruments could be in the form of checklists for students before departure for industrial attachment, or for junior academic staff before embarking on supervision visits to industry. Others could be pre-departure briefings and post-assessment meetings.

The published rules and regulations for student engagement in industry are the key guide the students from year to year, and insights gained on both policy and practice should be added periodically in the revisions of documents such as the university yearbook. This would reduce recurrence of problems such as placement of students in workplaces which do not satisfy either the professional or social expectations of both students and the institution.

If quality awareness is to be standardised among various participants and within accepted limits, there would be need to keep track of agreed and stipulated approaches to the practice of industry-based learning. This refers to institutional approaches such as the pre-industrial attachment procedures, the timing and frequency of assessment visits and the determination of grades from various components of student assessment of industry-based learning. Sharing of notes among universities that use the pedagogy of industry-based learning was suggested by respondents in the study and appears to be one way of obtaining information for self-regulation and improvement in this regard. The implications to a university for a standardised procedure may be the strengthening of systems and the employment of appropriately qualified and knowledgeable people in positions that deal with industry-based learning. This also goes for the university-industry relationship, which would be enhanced by employing personnel with high

people skills as well as discipline-specific knowledge to help them deal with public relations issues.

6.5.2 Research

If, as found in the study, quality is relative and dynamic, research has a role to play in the discovery and systematic deployment of those practices and ideas that signify that characteristic of quality. The practice of branding and re-branding that corporate organisations use as a survival strategy and a competing tool must be adopted by universities. Staying with one product for over ten years without altering any of its attributes does not augur well for a learning organisation. A research and development culture built into university administration ensures that the institution is a site of continuous inquiry and analysis, where satisfaction surveys, revision of documents, and brainstorming of ideas, for instance, are common practice. Small research assignments undertaken often and persistently build bigger research ideas in enterprising environments. Although such efforts may require deployment of resources, such as finance, it is highly possible that well-coordinated efforts also earn benefits that would off-set the dreaded costs of carrying out research.

Opportunities for extension of research outside this study include the exploration of mixed methods as a way of investigating social phenomena in a dominantly science and technology environment. The methodology used in this study may arouse questions among practitioners hitherto only familiar with the traditional divide between qualitative and quantitative methods. Further the appreciation of the methodology might lead to its further development and improvement since the university is a site of creativity and innovation. When sharing findings of this study and other related studies within the university in public forums, this invites interest among other universities who may want to adopt the findings and recommendations, or adapt them to suit their own situations. This is the noble goal of intellectual engagement.

6.6 Conclusions and recommendations

Equipped with an understanding of the issues that emerge fro this study and their implications on practitioners in reference to policy, practice and research, it is possible to propose some way forward as a way of recognising the learning realised from such an

exercise. In this section I present the key conclusions among many others, and then provide recommendations for future action and for future research.

6.6.1 Conclusion I

In the current exercise of industry-based learning the value added to student learning, curriculum coherence and the relevance of the pedagogy, among others, have been perceived as an indication of quality practices that have been carried over from the initial inauguration of the programme when there was still much enthusiasm and great expectations.

Recommendations for future action:

i. Revitalise those areas that are doing well and publicise or popularise good practice.

ii. Incorporation of workplace-based learning in staff development programmes such as:

- Induction courses
- Continuing enrichment in-house courses (for lecturers and industry supervisors)
- The Postgraduate Diploma in Higher Education (PGDHE) as a core course for NUST lecturers and elective course for other participants (See Appendix XXI for an abridged course outline)

iii. Increase student awareness and participation in basic decision-making – set up student committees and appoint student representatives for voicing student concerns and reporting purposes.

iv. Strengthen the office of the Industrial Liaison Officer with all necessary support to interact with academic staff.

Recommendation for further research

i. Lecturers could engage in a variety of research activities on issues of their choice such as the analysis of workplaces, student expectations and actual experiences, views of industry staff and contributions possible between the partners.

6.6.2 Conclusion II

One of the greatest concerns especially among the students is the area of preparation and placement of students in workplaces, which affects student welfare and makes it difficult

for students to view their other experiences in an unbiased manner. Students question the grades they get in the final assessment as they compare their efforts to attain better, the misfortunes of landing in a particular company and not the other, and other fortuitous determinants to their performance.

Recommendations for future action

i.   Adopt the concept of continuous improvement. This is an area that may not be solved completely at once because placement depends on the state of the industry and on the availability of places. Only when the number of possible places far exceeds the number of students seeking placement can there be some benchmarking on which organisations offer valuable and comparable experience.

ii. On preparation ensure a compulsory and comprehensive pre-departure programme for all students, incorporating various players and participants who would explain their expectations to students.

iii. Establish multi-level bilateral communication between the university and workplaces to share information and practices. Management and practitioner teams could tackle different aspects of the engagement between the partners.

Recommendations for further research

i.   The university should consider conducting research into student welfare issues, including satisfaction surveys at various stages of the industrial attachment process on placement, induction, treatment by various industry staff, university lecturer communication and supervision.

ii. Institute built-in data collection strategies on all placements capturing the type and size of companies, variety of experiences and strengths and weaknesses of the company.

6.6.3 Conclusion III

The overall process of supervision and assessment of students has been rated as the lowest in terms of quality procedures. It requires standardisation and streamlining to integrate online or telephonic interviews between lecturers and students to capture performance on a continuous basis. The contentious issue of lecturer visits, their frequency, duration and timing is a persistent challenge that seeks answers beyond the academic sphere of influence. Also, attendant to this, the level and nature of

communication between academic and industrial supervisors was not conducive to a healthy partnership.

Recommendations for future action

   i.   Develop faculty-wide or cross-faculty assessment instruments that capture experiences and the student's contribution or pro-activeness over time.

   ii. Academics should involve industry supervisors in the interpretation of assessment instruments and keys.

Recommendations for further research

   i.   Obtain and document examples of best practice in supervision and assessment as described and done by other universities the world over, providing information for local debates and discourses.

   ii. Carry out studies on the effects and acceptance of various assessment formats for students.

   iii. Carry out studies on academic and industrial routes of communication, including interaction between lecturers and industry supervisors.

6.6.4 Conclusion IV

There is an overall general approval from all participant quarters for industry-based learning to continue to be implemented by universities even though there are various views on how well NUST is doing at the moment, effecting self-evaluation and self-appraisal especially among lecturers.

Recommendations for future action:

   i.   Decide on a model or example to guide the choice of compatible activities (See example of the developed Model in Appendix XII).

   ii. Explore a two-tier attachment model in which all students spend part of their attachment in small and medium-scale enterprises (SMEs) and the other part in large scale enterprises. They should spend at least 30% of their attachment period in each of the two environments.

Recommendations for further research

   i.   Explore empowerment projects suitable for SMEs and liaise with technical and vocational education and training (TVET) providers on a streamlined community development strategy to facilitate the increase of relevant knowledge to end-users.

  ii.   Conduct faculty or discipline-specific research on suitable models of engagement with various sizes of enterprise.

iii.   The university should intensify scholarly efforts to protect its intellectual property, and systematically develop all potentially innovative ideas to the end.

6.7 The Learning Journey: End or Beginning?

Taking a pause in this research endeavour and looking back I recall the long and lonesome journey that has dominated my coming this far. Research is indeed a lonely path that separates one from other people who are generally not bothered and unaware of one's obsession with it. Even those few engaged in it are pursuing their own themes and not many will specifically walk the same path of understanding and inquisitiveness so that one can share deeper meanings with them. I am encouraged though that, as Jansen, Herman and Pillay (2004:100) say, my research learning journey, though filled with obstacles, reversals and breakdowns, has nevertheless progressed to this decisive stage. The reassuring reward for me is the personalised transformation that I feel I have undergone, from a novice to a more confident and inspired researcher. The research learning experience, coupled with my prior classroom teaching history, has advanced my path towards the scholarship of discovery in pedagogic research and managing research, as well as towards the scholarship of application (Stefani, 2006:114), taking me steps ahead in my linking of research to theory and practice.

By engaging the subject of my research study, namely quality through industry-based learning, my grasp of pertinent issues has increased. One particular example is my conception of the hierarchy of learning strategies for acquiring competence or skills for work, which I have created and developed in Figure 6.1. The model is a personally constructed depiction (synthesised from various learnings and with insightful extension derived from experience and from reading the literature) of my emerging understandings and thoughts stirred up by the responses of participants in this study. It is an untested creation which it is my wish to qualify and modify through future research.

The model describes a sequence of learning experiences possible for all types of learners. Starting from the basic theoretical lecture in a classroom setup, normally for short duration and simple tasks, the hierarchy moves up through the depicted stages to workplace learning which is designed for prolonged learning of complex sets of related cognitive, psychomotor and attitudinal capabilities.

Theory lesson	• Students listen and read about how an activity/task is performed • Minimal hands-on activity and pertaining to simple skills
Demonstration	• Students watch someone (an expert) performing an activity/task • Purpose is learning rather than making a working product
Simulation	• Students perfom a virtual task on the computer • Minimum manipulation but level of skills learnt can be complex
Laboratory/workshop	• Students perform an activity in a contrived setting • The product is usually not of quality
Field work	• Students go out into the real environment but only for a short period • Much of the learning and organisation occurs back in the classroom
Industrial Attachment	• Students perform real tasks on a lighter scale • Prolonged periods in the workplace
Apprenticeship	• Students learn by perfoming real tasks in the workplace • Spend more time in the worplace than in an institituton
Workplace learning	• Students learn by performing real tasks in real time • Takes place in the workplace ,study part- time or by distance education

Figure 6.1 Learning for competence

The research effort might be the end of a journey but to me it is also the beginning of a new focus on my academic career. My new resolve is to endeavour to incorporate more research in my practices and increase knowledge of universal application relating to my work and in my interaction with others.

6.8 Conclusion

Through situated inquiry of appropriate learning and assessment practices as seen through the eyes of the participants, this study has sought and accomplished support for the university to consolidate its unique competitive advantage, the industry-based learning

pedagogy. The study interrogated the efficacy of selected quality indicators in the domains of curriculum coherence, learning and assessment processes, among others in an attempt to link learning with real world application. The findings are positive that industry-based learning is an effective strategy and its application at the university under study is achieving reasonable success, with some crucial adjustments that were needed as highlighted in relevant discussions throughout the study report. Analysis and interpretation of all claims have led to the conclusions and recommendations put forward earlier in this chapter, chief among them being the realisation of quality opportunities to grow and learn from them. Further discussions and deliberations with the gatekeepers and stakeholders of the industrial attachment programme may shed light on how many of the recommendations can and need to be addressed, in the short, medium or long term. Similarly, further research is necessary to scientifically get to the bottom of what seems to be either going well or not in a practice that has so much potential and appeal to participating communities and individuals.

This study has hopefully opened debate on the importance of reflecting continuously on quality assurance in university education in general, and in industry-based learning activities at the National University of Science and Technology in Zimbabwe specifically. The study recognises learning as a celebrated occupation for individuals and organisations, and prods proponents of learning in higher education institutions to broaden the scope of strategies to achieve relevance and utility in their communities of practice.

Communities struggle to provide fulfilling lives for their citizens. A liberating and empowering education helps us to make good decisions, contribute to public life and live as responsible citizens of a caring world. Our colleges and universities are encouraged to try to provide learning that has direct and tangible consequences in the context of living communities. According to Ramaley (2005:180) 'individual aspirations and personal goals can be most productively advanced when research and education are inspired by *both* a thirst for knowledge and a desire for practical outcomes. This should be the defining feature of all kinds of post-secondary institutions, whatever their mission'.