Motivation for developing a qualitative methodological basis for the analysis of historical curriculum changes

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Abstract— **The qualifications National Diploma (NDip) and Baccalaureus Technologiae (BTech) have been offered by Technikons and since 2006 by Universities of Technology (UoTs). As a result of government drives for a new technology training programme a Bachelor of Engineering Technology (BEngTech) is being introduced. This study of perceptions of change by industry, lecturers and the professional body is meant to serve as feedback to enable curriculum development to be more aligned to the needs of the stakeholders. For engineering researchers the difference between theory and epistemology is still often confusing and while engineering theories are often well established and tacitly understood (essentially positivist); social science theories however embrace different ways of seeing the world and different epistemological positions. With this as background, a choice had to be made between a quantitative and a qualitative research process to accomplish the objectives of the study in question. The present research is aimed at exploring the extent to which stakeholders have inputs (and of what value) in the process of curriculum development, as little is known about the relevant curriculum changes and their impact on technology students in South Africa. As there is no present analysis of such change, the preferred research approach was originally undefined and open to a wider range of methodologies than is common for engineering research – even in engineering education. As a result of an analysis the decision was made to follow a qualitative, exploratory, descriptive and contextual methodology. In particular grounded theory was selected as the research method of choice. The aim of this paper is to describe why a qualitative methodological approach is better suited to an analysis of historical curriculum changes and their impact on technology students in South Africa than a quantitative approach.**

Keywords- research design; qualitative research; meta-theory.

I. INTRODUCTION

This meta-study is focused on a doctoral study investigating the impact of changes in the curriculum of Mechanical Engineering Technology students in South Africa. The present qualifications are based on the NATED system (used in South Africa), as was offered by Technikons and since 2006 by UoTs [1]. The study of the changes as perceived by industry, lecturers and professional bodies, is meant to act as feedback to enable future curriculum development to be more congruent with the needs of the stakeholders. The study is aimed at exploring the extent to which stakeholders have inputs of value in the process of curriculum development.

The BEngTech curriculum will be rolled out by all UoTs and also those Comprehensive Universities (CUs) that choose to offer the degree in South Africa in the near future. The BEngTech level descriptors and outcomes have been approved by the Engineering Council of South Africa (ECSA) and has a strong alignment with world standards as is evident in the following statement about the BEngTech by ECSA: "International comparability of engineering education qualifications is ensured through the Washington, Sydney and Dublin Accords, all being members of the International Engineering Alliance (IEA). International comparability of this engineering technologist education qualification is ensured through the Sydney Accord" [2]. The council further says, "The exit level outcomes and level descriptors defined in this qualification are aligned with the attributes of a Sydney Accord technologist graduate in the International Engineering Alliance's Graduate Attributes and professional Competencies" [2].

This paper will consist of an exploration of the methods of research utilised to achieve the goals articulated above. The purpose of this paper is to explore and describe the reasons why a qualitative methodological approach is best suited to study the impact of reported changes in the NDip and BTech in Mechanical Engineering programmes in the past. So far little is known about the relevant curriculum changes and their impact on technology students in South Africa, which is why the preferred research approach to be followed is qualitative, exploratory, descriptive and contextual. In particular, grounded theory will be the research method of choice in the actual study.

II. PROBLEM STATEMENT

In analysing the original study's aims it was clear that there was a range of possible research methodologies that could be considered to approach research into the analysis of historical curriculum changes and their impact on technology students. While engineering education research reported is predominantly quantitative in nature it became obvious that some of the nuances involved in determining the influence of the various stakeholders in the development of the curricula of engineering qualifications cannot be determined quantitatively, and calls for a more contextual and descriptive research approach. It therefore became obvious that a rigorous selection process needed to be performed. While it seemed that a qualitative research approach would be better suited to

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investigating the research problem than a quantitative approach, this could not be justified by the authors without a more complete consideration of the study and its data sources. In this study of the doctoral research study design lay the motivation for the development of the research question to be addressed in this paper:

Why is a qualitative methodological basis best suited to the analysis of historical curriculum changes, the various stakeholders' impact on the curricula that emerged in the past, and the impact of such changes on engineering technology students in South Africa?

III. PURPOSE OF THE STUDY

The aim of this paper is to describe the motivation for the selection of a methodological research approach that is better suited to the research question in the primary study than a quantitative approach might have been. This can best be illuminated by reference to figure 1. In figure 1a the nature of the doctoral study is indicated – the study involves a number of stakeholders and the curricula of the various engineering schools in South Africa. The data sources are the content of the various documents, interviews and related media that have a bearing on the topic of curriculum change in engineering technology education in South Africa.
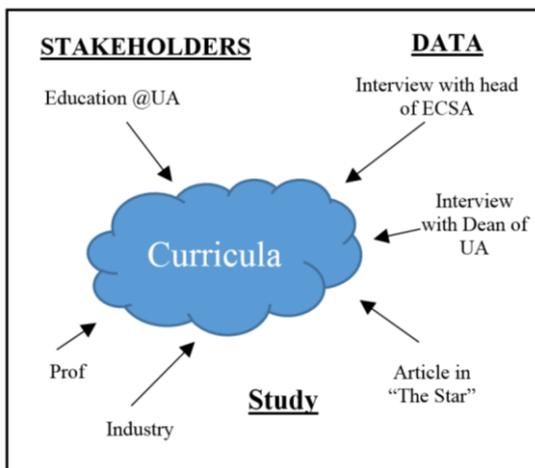

Figure 1a. Study of the effect of stakeholders on curriculum change in SA
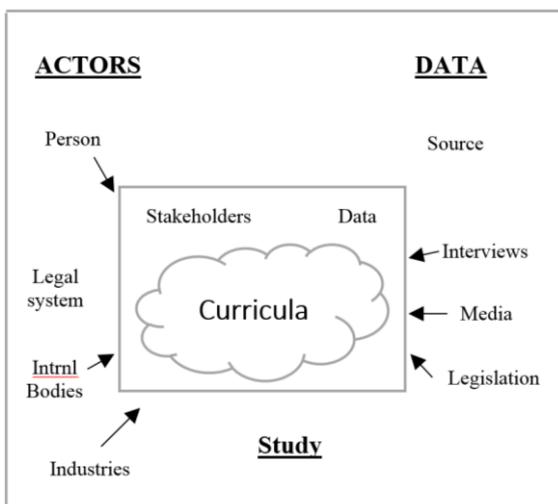

Figure 1b. Meta-study: Study definition of this paper

In figure 1b however the nature of the research being reported here is indicated. In this case the subject of the study is the whole of the study referred to in figure 1a, i.e. figure 1a is embedded in figure 1b in its entirety. The data is no longer the content of any individual source *per se* but the data for the meta-study is in fact now the source types of the data that will be collected in the primary study.

IV. RESEARCH DESIGN AND METHODS

What is qualitative research design?
Qualitative research is based on the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry [3]. Qualitative research design is exploratory, descriptive and interpretive, and contextual [4]. This is different from quantitative research, which Denzin sees as a research approach that emphasizes the measurement and analysis of causal relationships between variables, not the explication of processes and their interdependencies [3].

Qualitative research is characterized by the collection and analysis of textual data through surveys, interviews, focus groups, conversational analysis, observation, ethnographies and so on [5]. This research methodology concentrates on context within which the study occurs. The research questions that can be answered by qualitative studies start with: What? Why? How? Answering these types of questions requires a "thick description" – rich, contextual data that cannot be reduced to simple numbers [5]. Borrego et al. [5] claim that several authors have pointed out the danger in assuming that qualitative research is easier and less rigorous than quantitative research. Qualitative research is rigorous, and involves its own set of data collection and analysis methods that ensure trustworthiness of the findings even in the absence of statistical procedures.

Tonso contrasts qualitative research with anecdotal information, Anecdotal information is collected haphazardly as it becomes available, while qualitative research involves the careful planning of a research design that encompasses all aspects of the study, from research questions to sampling to data collection and analysis [6].

Little is known about the changes in curricula and their impact on technology students, so qualitative methods make it possible to start the study inductively, without a hypothesis – allowing the data collected to drive the direction. The data that will highlight the changes and their impact is contextual and will be extracted using document analysis and interviews. Open-ended questions will be used during data collection.

What is quantitative research design?
Quantitative studies [3] within engineering education rely heavily on statistics derived from surveys or commercial instruments [4]. Much of engineering research seeks to identify how outcomes are determined by reducing plausible causes to a discrete set of indicators or variables e.g. mechanical failure. Quantitative studies are a good fit for a deductive approach, in which a theory or hypothesis justifies the variables, the purpose statement, and the direction of the narrowly defined research questions. The hypothesis being tested and the phrasing of the research questions govern how data will be collected, as well as the method of statistical analysis used to examine the data [7].

The purpose of quantitative studies is for the researcher to project his or her findings onto the larger population through an objective process [3]. Data collected from a sample of the entire population allow the researcher to generalize or make inferences. Results are interpreted to determine the probability that the conclusions found by analysing the sampled data can be replicated within the larger population. Participant selection is driven by the need for a statistically representative sample. Quantitative research uses closed questions with limited reach.

Table 1: Comparison between quantitative and qualitative research

Quantitative Research	Qualitative Research
1. Absolute truth about knowledge out there	1. Human experience and perceptions
2. Use statistical methods	2. Rely on the depth of the data; hence sample size doesn't matter
3. Measure amounts or quantities	3. No theoretical notion
4. Use large samples	4. From the inside out
5. Generalization of the findings	5. Sensitizing concepts
6. From the outside in	6. Researcher's attitude unprejudiced
7. Closed questions	7. Searching from the unknown
8. Hypothesis	8. Theory to emerge from the data
9. Deductive in nature	9. Development of mini theory that can be applied to a particular situation
10. Knowledge through the eyes of the researcher	10. Validity of the mini theory or grand theory
11. Technical considerations – what can be measured; what can be sampled	11. Open questions
	12. Inductive in nature
	13. The reader generalizes the findings
	14. Ethical issues
	15. Trustworthiness
	16. Data collection methods

In considering the research design and methods, it is relevant to reference Table 2 below for a better understanding of the qualitative research process.

Table 2: The research process [8]

Phase	Description
1. Researcher as multicultural subject	History and research traditions
	Conception of self and the other
	Ethics and politics of research
2. Theoretical paradigms and perspectives	Positivism / postpositivism
	Interpretivism, constructivism, hermeneutics
	Feminism
	Racialized theories
	Critical theory, Marxist theories
	Cultural studies models
3. Research strategies	Study design
	Case study
	Ethnography
	Grounded theory
	Life history
	Historical method
	Action and implied research
	Clinical research
4. Methods of collection and analysis	Interviewing and observing
	Artefacts, documents and records
	Visual methods
	Data management methods
	Computer assisted analysis
	Textual analysis
	Focus groups
	Applied ethnography
5. The art, practices, and politics of interpretation and presentation	Criteria for judging adequacy
	Practices and politics of interpretation
	Writing as interpretation
	Policy analysis
	Evaluation traditions
	Applied research

Theoretical paradigms and perspectives

Case and Light [9] argue for the value of using a broader definition of methodology, referring to a theoretical justification for methods used in a study [10]; [11]. Methodology is the philosophical justification for the research design and accompanying methods and should contain the relationship between the underlying epistemology, theory, research question and adopted method [12]. Case and Light [9] quote Cousin [13] who states that methods are best understood as the tools and procedures we use for our inquiries, while methodology is about the framework within which they sit.

These questions act as a guide for the discussion of methodology in a research study [9]; [10]:

- Why the researcher chose that focus
- Why the study was designed by the researcher in that way
- Why alternatives were rejected
- What were the questions that the researcher asked
- How the researcher ensured that confidence could be felt in the data gathered and in their analysis of those data

While arguments for using a particular methodology are unique to a study, methodologies are not [9]. Crotty [14] locates methodology within four key elements of the research process [9]:

- Methods: the techniques or procedures used to gather and analyze data related to some research question or hypothesis.
- Methodology: the strategy, plan of action, process, or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes.
- Theoretical perspective: the philosophical stance informing the methodology and thus providing a context for the process and grounding its logic and criteria.
- Epistemology: the theory of knowledge embedded in the theoretical perspective and thereby in the methodology.

It can be seen that methodological choices are not separate from choices of theoretical perspective and epistemology.

Koro-Ljungberg and Douglas [15] discuss that positivist and post-positivist perspectives (as are typical of quantitative research) are hypothesis-driven and center on establishing "cause and effect" relationships. The situational perspectives of qualitative research include interpretivism, critical theory, and poststructuralism, and although they each have slightly different objectives, they differ from positivist and post-positivist perspectives.

Situational perspectives are focused on delivering understandings of particular situations or experiences, and are inductive in approach. Such an analysis allows insights and findings to emerge throughout the data collection and analysis process. Participant selection is usually purposive in such cases.

Interpretivism is concerned with gaining an increased understanding of people's subjective experiences.

Critical theory is directed towards a critique of social inequities and power relationships with the ultimate goal of facilitating social change.

Poststructuralism and postmodernism look to deconstruct the taken for granted "truths" or "grand narratives" through which society operates.

Table 3: Epistemology, Methodology and Methods (adapted from [12])

Epistemology	Methodology	Methods
Interpretivist, Constructivist	Ethnography	Participant-observation. Notes from meetings, casual conversations, and observations of work practices. Organizing data through narrative and categorization.
Interpretivist (discourse analysis)	Discourse analysis	Recording of group lab sessions, interviews. Analysis of instances of concept negotiation through Gee's (1999, 2011) building tasks. Identification of discourses influencing the conversations
Interpretivist (phenomeno-graphy)	Phenomeno-graphy	Individual interviews. Phenomenographic analysis to identify a hierarchy of different conceptions or ways of being and knowing.
Empiricist, Positivist	Verbal protocol	Recording of students solving a design problem; quantification of parameters; statistical analysis of group differences and correlations.
Critical theory	Critique/social analysis	Critical thematic analysis of literature.
Interpretivist, Constructivist	Case Study	In-depth study of a distinct, single instance of a class phenomena;
Interpretivist, Constructivist	Grounded theory	Using of data to develop theory;

We shall discuss briefly research methods that are relevant for the research topic at hand, namely grounded theory and case study.

Grounded theory

Grounded theory was established in a seminal piece of work by Glaser and Strauss [9]. It was one of the methodological positions put forward that supported the use of qualitative data in social research [9]. The major purpose of grounded theory is to begin with the data and use it to develop a theory [7]. Grounded theory is helpful when current theories about a phenomenon are either inadequate or non-existent. According to Charmaz [7] grounded theory methods consist of systematic, yet flexible guidelines for collecting and analysing qualitative data to construct theories from the data themselves. Flick [16] confirms that theories should be developed from empirical material and its analysis; these theories should be grounded in such material; dominant approaches would be observation and ethnography; interviews and documents. Charmaz [7] states that grounded theory begins with inductive data, invokes iterative strategies of going back and forth between data analysis, uses comparative methods and keeps you interacting and involved with your data and emerging analysis. Leedy and Ormrod [17] note that this theory has its roots in sociology, but that it now is used in other fields such as anthropology, geography, education, nursing, psychology and social work. Grounded theory has been used in wide range of topics such as a study of children's eating habits, college students' thoughts and feelings during classroom discussions and workers' stress levels in public service agencies.

Case study

A case study can be described as an in-depth study or examination of a distinct, single instance of a class of phenomena such as an event, an individual, a group, an activity or a community [9]; [18]; [19]. According to Denzin and Lincoln [3] case studies focus on an "individual unit", what Robert Stake [20] calls a "functioning specific" or "bounded system." The decisive factor in defining a study as a case study is the choice of the individual unit of the study and the setting of its boundaries, its "casing" to use a suitable term. A case study research method is preferred in situations where the main research questions are "How" or "Why" questions and where the researcher has little or no control over behavioral events; and the focus of the study is a contemporary (as opposed to entirely historical) phenomena [21].

Table 4: Checklist for Researchers Attempting to Improve the Trustworthiness of a Case Study [22]

Phase of the Case Study	Questions to check	
Preparation phase	Data collection method	
		How do I collect the most suitable data for my Case Study? Is this method the best available to answer the target research question? Should I use either descriptive or semi-structured questions Self-awareness: what are my skills as a researcher? How do I pre-test my data collection method?
	Sampling	
		What is the best sampling method for my study? Who are the best informants for my study? What criteria should be used to select the participants? Is my sample appropriate?

		Is my data well saturated?
	Selecting the unit of analysis	
		What is the unit of analysis?
		Is the unit of analysis too narrow or too broad?
Organization phase	**Categorization and abstraction**	
		How should the concepts or categories be created?
		Is there still too many concepts?
		Is there any overlap between categories?
	Interpretation	
		What is the degree of interpretation in the analysis?
		How do I ensure that the data accurately represent the information that the participants provided?
	Representativeness	
		How do I check the trustworthiness of the analysis process?
		How do I check the representativeness of the data as a whole?
Reporting phase	**Reporting results**	
		Are the results reported systematically and logically?
		How are connections between the data and results reported?
		Is the content and structure of concepts presented in a clear and understandable way?
		Can the reader evaluate the transferability of the results (are the data, sampling method, and participants described in a detailed manner)?
		Are quotations used systematically?
		How well do the categories cover that data?
		Are there similarities within and differences between categories?
		Is the scientific language used to convey the results?
	Reporting analysis process	
		Is there a full description of the analysis process?
		Is the trustworthiness of the content analysis discussed based on some criteria?

Data collection

Flick [16] defines sampling as a method of selecting cases or examples from a wider population so that the research in the end can make statements that apply not just to the individual participant of a study. Yin [21] highlights four ways of doing sampling, namely: purposive, convenience, snowball and random sampling. Purposive sampling is about choosing a deliberate manner of sampling. The goal of purposive sampling is to have those participants who will yield the most relevant and plentiful data for the specific study

Data analysis in qualitative research differs significantly from that in quantitative research. Qualitative data analysis is an ongoing process consisting of data collection, analysis, more data collection, to the point of data saturation. Analysis of data takes place simultaneous with data collection, interpretation and the writing of the paper.

Data saturation is a core concept in qualitative data analysis and refers to the stage at which any additional data collection will only result in more of the same findings [19]. Dey calls data

saturation an "unfortunate metaphor", suggesting that we now should speak of theoretical sufficiency, whereby we have categories that are sufficiently described by our data [19].

Measures to ensure trustworthiness

There has been much debate about the most appropriate terms (rigor, validity, reliability, trustworthiness) for assessing qualitative research validity. Marshall and Rossman [23] quote Lincoln and Guba [22], on questions that determine the trust we have in a research: do we believe in the claims that a research study puts forward? On what grounds do we judge these as credible? What evidence is put forward to support these claims? How do we evaluate it? Are the claims potentially useful for the problem we are concerned with? So the aim of trustworthiness in a qualitative study is to support the argument that the findings are worth paying attention to. Marshall and Rossman [22] refer to the terms reliability, validity, objectivity and generalization as older terms, that Lincoln and Guba [22] have modernized into credibility, dependability, confirmability and transferability. Lincoln and Guba [22] offered a set of procedures to help ensure that these standards of trustworthiness would be met.

Research design and methodology in this paper

This section is aimed at clarifying how the authors went about to achieve the aim of this meta-study, i.e. what research design was involved and which research methods were followed in this paper.

A qualitative research approach is followed for this paper. From table 1 it can be seen that qualitative research is concerned with interpretive skills in dealing with human experience. The paper is focused on the reasons for choosing qualitative methods for the primary study. This research is exploratory, contextual and specific.

The researcher as tool

The qualitative research process followed in this meta-study starts, as illustrated in Table 2, with the researchers as an integral part of the study in question – each of whom approach the research from a different historical and research perspective. Two researchers emanate from a traditionally *quantitative engineering background* and one from a *social sciences background* with a specific interest in qualitative research paradigms. These contrasting and complementary perspectives of research could be considered a form of investigator triangulation. (Triangulation refers to the use of multiple methods or data sources to study phenomena, thus enhancing the trustworthiness of the research [24]).

Theoretical paradigms and perspectives

The theoretical paradigm underlying this paper is *interpretivist*, which implies that reality is constructed inter-subjectively through socially and experientially developed meaning and understanding, through social constructions such as language, consciousness, shared meanings, and instruments [25].

Research strategy

According to Bakker (in [26]), *case study* research is concerned with the interpretation of human meaning. In this paper the researchers choose to focus on the case, i.e. the study as depicted in Figure 1a, because of the need to examine the case in detail, in order to fully understand the meaning given by

stakeholders to the historical curriculum changes that are studied.

Data collection and analysis

For this research paper purposive sampling will be used. The data sources are the discussion minutes for the meetings that were held between the supervisors and the student, as well as the research proposal for the primary study, and verbal information from the supervisors and the student.

Krefting [27] suggests various strategies to ensure credibility. These strategies are reflexivity, triangulation, member checking, interview process and peer evaluation. Credibility is here ensured through the fact that what is contained in the discussion minutes, the contents of the proposal and the input from the researchers can be triangulated.

V. ANALYSIS

Research into a variety of engineering education topics could theoretically be pursued using either quantitative or qualitative methodologies. In fact, there are excellent examples of both methodologies in the field. What is lacking, however, is a formal process discussing the selection of a particular methodology for a specific study.

Bridging the gap between studies that have randomly developed into either quantitative or qualitative studies we aim in this section to analytically apply a formal process to the selection of the methodology that best suits the study that forms the basis for this project.

This is against the popular assumption that engineering studies are always quantitative. Engineering based studies often lack clear research methodologies and there should be a distinct effort to encourage engineering authors to state the research methodology in their research.

The primary study in question is centred around curriculum. The stakeholders are educators from the universities of technology (UoTs), the Engineering Council of South Africa (ECSA) and industry. Data will be collected through interviewing educators and administrators from the universities, members of ECSA and also collect media statements that discuss industry's perception of Mechanical Engineering Technology graduates.

Table 5: Comparison of qualitative research methods and its relevance to this study.

Method	Purpose	Data Source	Comment
Grounded Theory	Begin with data, theory emerge from data	Interviews Documents Field notes	This method can assist in the primary study
Ethnography	Culture is the central point; researcher is there to observe	Notes Observations	Not appropriate. Even though the researcher is a lecturer in the same program, he is not there as an observer.
Action research	Strategic improvement of practice	Democratic inquiry	Participants are actively involved in the research. For the primary study this is not the case
Phenomeno-graphy	Individual point of view; Potential experience	Semi-structured interviews	The primary study is not looking at individual point of view or experience. Changes and their impact have to be tracked. Not appropriate
Discourse	Everyday life; gives insight into the beliefs, values and world views from participants.	Recordings	Not appropriate. The primary study is not about beliefs, values and world views from the participants.
Case study	In-depth study of a distinct, single instance of a class phenomena;	Single event	The primary study can easily be researched as a case. But because theory has to be allowed to emerge from data, treating it as a case is not appropriate.
Narrative	Literature studies	Narrative interviews	This is not relevant. The changes and their impact are not known, through documents and interviews they have to be tracked.

Table 5 outlines the discussion that was rigorously engaged in by the supervisors and the student. The back and forth discussions eliminated quantitative research and resulted in a qualitative research approach and grounded theory as method of choice.

VI. FINDINGS

The findings of the research question, viz:

Why is a qualitative methodological approach best suited to the analysis of historical curriculum changes, the various stakeholders' impact on the curricula that emerged in the past, and the impact of such changes on engineering technology students in South Africa?

The research questions for the primary study are:

- What are the historical changes in the curriculum of Mechanical Engineering Technology students?
- What is the impact of these changes as perceived by lecturers, engineering bodies, students and industry?

The data indicates that the primary study is interpretive, descriptive and exploratory in nature, and seeks to develop theory around curriculum changes.

Research design and methodology

Qualitative research methods are better suited to the primary study. Table 1 shows that qualitative research is concerned with human experience. The research questions that can be answered by qualitative studies start with: What? Why? How? Answering these questions requires a "thick description" approach; one in which the contextual descriptions of data are paramount to understanding the nature of curriculum change. From the initial review of the primary study it was clear that it was not possible to develop an *a priori* hypothesis that could be defended from previous research. From an analysis of the various data sources it was clear that there were no large samples of population that could be considered for statistical analysis. The researchers are following the research process that is unpacked in table 2 instead.

The researcher as tool

The researchers who are involved in the primary study were actively involved in the discussion of the research process of the study. Two of them are mechanical engineering lecturers who have been exposed to quantitative processes and the other one comes from humanities and has experience in qualitative research. The engineering researchers are ECSA members and are involved in engineering education at institutional levels. These contrasting and complementary perspectives of research could be considered a form of investigator triangulation.

Theoretical paradigms and perspectives

The data shows that the primary study is about understanding changes and their impact as perceived and also documented by participants from institutions, professional bodies and industry. Curriculum will be analysed. The theoretical paradigm underlying the primary study is *interpretivist*, which implies that reality is constructed inter-subjectively through socially and experientially developed meaning and understanding, through social constructions such as language, consciousness and shared meanings [25]. The primary study seeks to explore and understand curriculum changes and their impact over the past 20 years. Grounded theory is best for such longitudinal studies, given its nature shown in Table 5.

Research methods

The initial review of the context and the possibly available data lead the researchers to choose between a case study, ethnography and grounded theory. Little is known about the topic that is being researched, implying that theory will need to emerge from the data as there is no prior information in which to base a proposed hypothesis or even delimit the boundaries for a case study. Ethnography was also eliminated as a methodology as it looks at groups that share a common culture – but this is not true for the various actors in the curriculum development process at all. Grounded theory - being the method that allows the data to develop themes of interest is helpful when current theories about a phenomenon are either inadequate or non-existent hence it was selected as method.

Data collection and analysis

Data has to be collected from the various Universities of Technology (UoTs), Comprehensive Universities (CUs), the professional body (ECSA), industry and from alumni. According to Yin [21], purposive sampling is about choosing a deliberate manner of sampling. Since there are limited numbers of data sources, purposive sampling is the only practical manner to proceed in the primary study. Documents will be examined from the institutions and from ECSA. Interviews will be conducted with available lecturers, Heads of Departments, students, ECSA members and industry representatives.

In such a study, the investigation continues until data saturation is achieved. Repetition of thematic material from a variety of sources contributes to the trustworthiness needed to be able to draw even preliminary results from the study.

VII. CONCLUSION

The research question for this paper has been addressed by an in-depth study of quantitative and qualitative methodologies. This paper uses a case study method for answering the research question. After a thorough investigation of the research methods, grounded theory methods of research seem to be the most suitable research tools for the primary study. The decision was reached to use grounded theory based on a case study approach to answer the meta-study research question.

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