

Vocational and Technical Education Changes that are Potential Contributors
to the Economic Development of Trinidad and Tobago

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Dissertation submitted to the Faculty of Virginia Polytechnic Institute and
State University in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

in

Vocational and Technical Education

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April 19th, 2001

Blacksburg, Virginia

Key Words: Economic development, Vocational and Technical Education,
Trinidad and Tobago, Q-methodology

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(ABSTRACT)

The objectives of this study were to determine what perceived changes to VTE have the potential to improve development of the economy in the next 3 to 5 years and which of these identified changes will have the greatest impact. To achieve this objective, a selected group of experts representing international development, business, economics, labor, manufacturing, service industries, and education were asked to participate in the study. First, the experts were requested to list five to eight statements, based on their experience and perceptions, about what changes to VTE have the potential to improve the development of Trinidad and Tobago economy in the next 3 to 5 years. Next, they were asked to rank-order their identified 60 statements on a continuum that approximated a normal distribution from “most important” to “least important.” Rank-ordered statements were analyzed using Q-factor analysis (PQMethod).

From the rank-ordered statements, eight factors were identified as having the potential to improve the development of Trinidad and Tobago’s economy. These factors were (a) access to and quality of VTE, (b) VTE higher education programs, (c) VTE program quality, (d) VTE program comprehensiveness, (e) fundamental aspects of VTE, (f) preparation for and advancement in VTE careers, (g) meeting VTE student and program needs, and (h) understanding VTE's purpose. Statements associated with each factor serve to clarify the focus of VTE related activities that may be initiated to improve development of the economy.

The most important of the identified factors was Factor 1 (access to and quality of VTE) which accounted for 15% of the explained variance in the factor matrix. The second most important factors were Factor 3 (VTE program quality) and 5 (fundamental aspects of VTE) with each accounting for 13% of the explained variance. All three of these factors (Factors 1, 3, and 5) had an average reliability coefficient of .800, a composite reliability of .889 at a significant value of $p < .05$.

ACKNOWLEDGEMENTS

The author wishes to express appreciation to the many individuals who by virtue of their technical assistance, encouragement, and contribution have made this research possible.

Special thanks to Dr. Curtis R. Finch, for serving as my program advisor and research committee chairperson, for his encouragement, words of wisdom, and for his multiple role as preceptor, friend, and guiding light in the turbulent storm of academic endeavors. Many thanks to the other committee members: Drs. John R. Crunkilton, Kurt Eschenmann, Daisy Stewart, and Josiah S. Tlou for provided constructive advice, professional guidance and direction making it possible to refine and focus this study.

My special thanks go to the College of Human Resources and Education, Department of Teaching and Learning and the Center for Assessment, Evaluation and Educational Programming at Virginia Tech. The Department of Teaching and Learning provided scholarship funding which enabled me to complete my studies. The Center for Assessment, Evaluation and Educational Programming assisted with the Q-sort survey programming and published the survey on their server. I am also indebted to all survey participants for their cooperation and assistance in participating in the questionnaires related to the research topic.

I am grateful to my friends from around the world who I met at the University Club, Blacksburg, VA. and school colleagues for their commemorative and friendship. A special thanks to my friend Paul Dettmann who struggled to understand the separation from my family during my study and for the road trips to and from our homes in Menomonie, Wisconsin.

Finally, I thank my spouse, Sandra-Ambika, and our children-Vishma, Avinash, Vimla, and Ambika for supporting each other during my time of absence from the family. Thanks to all.

DEDICATIONS

To my spouse Sandra-Ambika, our children—Vishmaa, Avinash, Vimla and Ambika, and my preceptors who know not why, but forever try, and took me into worlds I never dreamed existed.

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Chapter I

INTRODUCTION

The development of vocational and technical education (VTE) has become one of the most important strategies of educational development in both developed and developing countries. As a result, VTE has become an essential element in the economic development plans of many countries, and the role of VTE in the economic development of countries has been increasingly recognized (Anderson & Bowman, 1976; Chin-Aleong, 1988; Middleton, Ziderman, & Adams, 1993; World Bank, 1991). However, in recent years, globalization and technological advances have encouraged the diversification of many countries' economies, which in turn has intensified economic competition between nation-states. This process has called into question the future role of VTE in aiding a country's economic growth or development.

Nature of the Study

Conceptually, this study builds on the symbiotic relationship between globalization, technological changes, and human capital investment. The promotion of globalization has been a foundation of economic development for many decades. Moreover, the importance of technological changes to growth and the development of the industrial world has long been recognized. Changes brought about by globalization and technology push firms and government to reorganize and refocus human capital investment by changing the way education is organized and delivered. To this end, Berryman and Bailey (1992) reported that the United States organized its education--what is taught, to whom, when, and especially how--to match how the country organized its economic activities for decades. However, the authors continued, as economic activity changed, education was out of synchronization with the economic environment in terms of what its graduates needed to know and who needed to know it. While the United States and other developed countries had their education system linked to economic activity, Trinidad and Tobago's education system was designed primarily to provide employment within the government sector and, to a lesser extent, to prepare for further education.

Globalization

This study focused on several features affecting developing countries. In a broader sense these features affect all countries of the world and came together at the end of World War II. At that time, developed countries of the world slowly entered into a period of significant shift in their economies. This shift was characterized by two major developments: (a) changing patterns of trade and competition, and (b) technological innovations. Changing patterns of trade and competition led to the development of trading blocks, with its members receiving preferential treatment. Technological innovations, on the other hand, transformed production processes and changed the requirements for economic success. Today, globalization--the first feature of this study--is one of the most influential forces pushing changes in production processes and work organization. Globalization fosters economic policy that is designed to promote trade liberalization and encourage greater competition in a world that is becoming more

interdependent while competition spans national borders. In this global environment, countries react and adjust to economic shocks and demands generated beyond their national borders.

Another aspect of globalization is its ability to transform a society's social structure, bringing industrialization, mass education, occupational specialization, growing organizational networks, greater income equality, and a variety of associated developments that mobilize mass participation towards economic development. In this respect, two aspects of globalization are particularly relevant to economic development: (a) rising educational levels, which produce a more articulate public that is better equipped to participate in the growing industrial demands; and (b) rising occupational specialization, which first shifts the workforce into the secondary sector and then into the tertiary sector. These changes produce a more autonomous workforce, accustomed to thinking for themselves on the job and having specialized skills that enhance productivity (Inglehart, 1997).

While globalization of a country's economy offers enormous possibilities, in return it demands significant modifications in production behavior and education. According to Blanks (1999), one of the most hopeful developments now emerging that would significantly impact the field of VTE is for schools to formally adopt a dual mission for schooling: preparation for further education and preparation for economic self-sufficiency. The first part of this mission promotes individual opportunities by making students more competitive in the labor force. The second part makes a country economically strong; and firms, internationally competitive, by solving human performance problems of incumbent workers.

Reich (1991) noted that as a result of globalization "we are living through a transformation that will rearrange the politics and economics of the coming century. There will be no national products or technologies, no national corporations, no national industries" (p. 7). This transformation is placing strong socioeconomic and political pressure on countries to expand educational opportunities, even though developing countries may not have sufficient financial or human resources to support program growth. Thus educational development specialists face (a) the challenge to provide better quality programs with limited resources and (b) the need to conceive new ways to reach those who are in pressing need of services. Reich (1991) also argues that a nation's commitment to developing its citizens is the prime way to ensure global competitiveness and, consequently, economic development. If development of citizens is vital on a national basis, then it is of paramount importance for educational programs to reflect current and future skills needed for improving a country's economy.

Technological Changes

The second feature on which this study focused is technological changes. Rapid technological changes have opened economies to competition and affected modes of production, economic activity, and education. Faced with competition from developing countries, industrialized countries are moving away from mass-production industries and low-skill, service jobs to a more sophisticated technology- and knowledge-based system of production and services (Rondinelli, Johnson, & Kasarda, 1998). These altered conditions have changed the requirements for economic success by requiring greater

emphasis on factors that were less important to traditional mass-production systems and linkage to VTE.

Technological changes have also resulted in the transformation and diversification of workplaces and workforces, and differentiated skills and knowledge needed for success in the global economy. Thus, the prospect for economic success suggests both dismal and exciting consequences. According to Brown and Davison (1991), a major consideration for technological changes in the workplace has typically been omitted from VTE. Like other areas of education, VTE is not positioned to address economic imperatives (Petrina, Craven, & Powell, 1993). Despite generous budgets, innovative ideas, and large-scale technical inputs, many VTE programs have failed (Blung, 1984; Bowels, 1988; Middleton & Demsky, 1988; Dougherty, 1989). Outdated and irrelevant curricula and ineffectiveness in connecting programs with real-world experiences are failing VTE economic rationale potential (Dunn, 1988; Gray, 1990; Vaughan, 1991). In such circumstances VTE program failure can be attributed to its empirical paradigm, that drives programs and provides neither for the cultural context nor for flexibility, change or linkage to long-term economic diversification. However, despite program failure, many national governments and international donor organizations support VTE because it possesses the potential to link education with employment, improved productivity, and ultimately economic development.

In addition, technological changes, economic growth and diversification, trade liberalization, and the need to respond to international competition have shifted the kinds of skills needed in many countries. Thus the long-term effect of VTE learning and linkage to a country's economic development plan is crucial. If VTE programs are narrowly devised, then students are likely to have inadequate skills as work changes; and long-term employment experiences may be poor. If, on the other hand, VTE provides a wider and deeper understanding of work processes related to economic development, long-term effects should be positive.

A prominent requirement for VTE lies in its linkage to skill development and economic prosperity. Continuous changes as a result of technology--seen as vital to keeping a country's economy productive and healthy--place demands on individual workers and the institutions that prepare them. When VTE is aligned with the economic activities of a country, it will be able to respond to the continuous changes in the economy by developing specific programs based on the nature of the jobs. This in turn increases productivity by meeting the workers' lifelong learning needs and enhancing the country's overall competitiveness (Gray & Herr, 1998).

Human Capital Investment

The third feature on which this study focused is human capital investment. Human capital investment is embedded in the notion that a country's government goal is economic development. Thus education becomes a form of economic investment and consequently, the value of education is measured by its contribution to economic growth. In this context, the goal of education is to achieve the highest sustainable economic growth and employment and an increased standard of living. As such, a nation's education policies are tied to doctrines of economic growth through the creation of market economies. Education thus plays a dual role in a nation's plans. First, education

aims to aid the development of market economies through human resource development and lifelong learning. Second, education aims to remedy problems resulting from globalization such as unemployment, increased economic inequality, and fears of social and economic change (Spring, 1998).

While economic growth is the ultimate goal of each country, it is increasingly being organized around education in general and VTE in particular. The focus on VTE is to provide individuals with the necessary skills for enhanced employment over the long-term, and simultaneously emphasize concerns for what skills are needed in preparing students for potential employment. With this focus, VTE can become instrumental in economic growth by elevating the skills and knowledge of the workforce. However, according to Spring (1998),

Today, national governments are proclaiming education as the key to success in the global economy. In these proclamations, the goals of schooling are directly related to the world's economic needs. Education and the global economy are envisioned as having an interdependent relationship. Competition in the global economy is dependent on the quality of education, whereas the goals of education are dependent on the economy. Under these circumstances, education changes as the requirements of the economy change (pp. 5-6).

Such a strong educational relationship with economic development attracts and retains businesses and generates large economic returns through higher productivity and incomes. To this end Woodward, Miley, and Ulbrich (2000, n.p.) stated, "Education may not be the mother of economic development, but it matters as much as anything else, and probably a lot more."

Statement of the Problem

While industrial countries have, for the most part been able to move their economies forward through the linkage of education with economic activity, developing countries rely upon their natural resources to do so. A case in point is Trinidad and Tobago. The Government of Trinidad and Tobago remains committed to the development of a diversified and resilient economy, making use of the country's natural resource endowment and human potential (Trinidad and Tobago Medium Term Policy Framework: 1995-1997, p. 8). However, the Government policy for developing the country's human potential has been limited. For example, in education, a main avenue for developing human potential, the focus has been on curriculum development, diagnostic testing, work/study programs, and the restructuring of the educational management system. These efforts have concentrated at the secondary school level and focused on ensuring adequate preparation of students for entry into the job market. Despite heavy investment in secondary education, the system continues to face challenges in terms of raising levels of coverage, quality, and equity (Inter-American Development Bank, 1999).

The main issues with coverage, quality, and equity are associated with the large number of students graduating from high school without (a) basic cognitive and numerical skills (World Bank, 1996) and (b) vocational and technical skills geared to meeting the demands of the economy (Grover, Ciurea, Downes, Henry, & Leslie, 2000). These areas are of increasing importance in a globalized and high technology economy.

Also revealed is a pattern of systematic exclusion of certain youths from education and employment. The systematic exclusion can be attributed to unequal access to quality education. There is currently a 70% transition rate from primary to secondary schools. As a result, for each of the last 10 years, between 8,000 and 9,500 children were not placed into government secondary schools. The distribution of secondary school places by district remains unacceptably uneven, with transition rates varying from 40% in Tobago to 92% in St. Patrick, Trinidad.

While the government has begun to restructure education at the secondary school level, the focus on VTE has been to meet local employers' needs in traditional businesses and industries. This lack of focus has resulted in the poor linkage of VTE programs with employers and without any kind of basis for determining or organizing current programs' focus and needs. On the other hand, if the economic future of the country lies in competing more favorably in the global economy and high skill workplaces, VTE programs need to be attuned to current and future economic development of the country.

Today, changes brought about by rapid industrialization, plant modernization, increasing use of technology in the workplace, globalization, free-market, and the increased need for a quality world-class production and education system are affecting Trinidad and Tobago's national economy and education system. There continue to be many debates regarding the capacity of Trinidad and Tobago's workforce to meet employers' demands for more educated, technologically sophisticated, and multi-skilled workers. Despite a high unemployment rate there is a chronic shortage of skilled or professional qualified workers. For example, Grover, et al. (2000) reported 40% of the companies found it very difficult to find workers with adequate technical skills; and over 20% reported that appropriate job experience was very difficult to find. Thus the current VTE system is inadequate and is unable to produce the quality of education for the workforce to sustain the demands of the country's economy.

While economic growth is projected to continue in several sectors, with focus on occupations requiring people with education beyond high school, there is little doubt that these new high-skill, high-wage jobs will be accessible only to those with higher education or work-related experiences. In recent years questions relating to the focus of education and VTE in particular, have become increasingly prominent in discussions of economic development in Trinidad and Tobago. However, these discussions are centered more on a traditional model of VTE and do not give consideration to current and future economic needs of the country. The impact of this has filtered down into vocational educational organizations. VTE programs continue to be developed in a vacuum and are not attuned to the changing economy, thereby further limiting Trinidad and Tobago's competitive advantage as the country attempts to enter the global arena. Consequently, as the country attempts to become a leader in the global economy, VTE does not embrace these fundamental changes occurring nationally or in the international arena.

Purpose of the Study

The purpose of this study was to determine what direction Trinidad and Tobago's VTE should take to enhance future employment opportunities and further foster the economic development of the country. This study was accomplished by utilizing

responses from individuals in a variety of sectors who are actively engaged in education, economic development, labor, manufacturing, service industries, and related areas.

To achieve the purpose of this study, the following research questions were asked:

1. What perceived changes to VTE have the potential to improve the development of Trinidad and Tobago economy in the next 3 to 5 years?
2. Which of the identified changes to VTE will have the greatest impact on the economic development of Trinidad and Tobago?

Need for the Study

Over the past two decades, the economic fortunes of Trinidad and Tobago followed closely the world price of its major export commodity--oil. As the price of oil declined in the 1980s, reduced economic activity and decline in public revenues led to the retrenchments in both the public and private sectors. Consequently, the nation's unemployment rate doubled from 10% of the labor force in 1982 to 20% by 1992, while part-time employment increased from 8% to 15% during the same time period.

Today, Trinidad and Tobago remains largely an oil economy, even though oil reserves are being depleted. While the natural gas sector is slowly being developed to benefit the economy in the future, it will not solve the country's most crucial economic problems. "Only by diversifying into more labor-intensive (ie. *employs large number of workers*) export industries and services will Trinidad and Tobago generate employment and growth and minimize its external vulnerability" (World Bank, 1996, n.p.). While the country has made efforts to diversify its economic base and refocus its industrial development priorities, certain labor-intensive industries still remain under utilized due to the unavailability of adequate VTE programs and poor linkage between VTE and the country skill needs (Grover et al., 2000).

Like the petroleum industry, gas-based industries are highly capital intensive and contribute little directly to employment creation. Thus, while development of gas-based industries has reduced the economy's dependency solely on oil, it has not eliminated the need for employment-generating growth from non-traditional, labor-intensive sections.

Trinidad and Tobago traditionally had good health and educational services, but both have deteriorated significantly in recent years due to falling public expenditures. In health, real per capita expenditure halved during the 2nd half of the 1980s and 1st third of the 1990s. The decline in education has been even more severe, with real annual expenditures during the 1st half of the 1990s amounting to one-fifth of their 1982 levels. Further analysis by World Bank education specialists revealed a pattern of systematic exclusion of certain youths from education and employment. The systematic exclusion can be attributed to unequal access to quality education for poor families, outdated teaching methods and learning assessment, lack of adequate or appropriate instructional materials, unsatisfactory school conditions, and overcentralized and inefficient administration and service delivery from the Ministry of Education to the schools (World Bank, n.d.). For example during the 1995-96 academic year, about 21% of the 313,652 youngsters between 5 and 16 years of age, were absent from the formal school system. About 13,500 youngsters between the age of 15 and 19 were seeking jobs but could not find employment. The limited number of school places at the secondary level resulted in about 30% of students at that level leaving school early or enrolled in vocational and

technical schools. However, only 5,000 of those students attended any of the 15 vocational and technical schools located in Trinidad and Tobago.

Several speeches by the Prime Minister of the Republic of Trinidad and Tobago, Mr. Basdeo Panday, explain the government's education philosophy. In his speech at the 10th Anniversary Celebration of the Caribbean Academy of Science, September 25, 1998, Prime Minister Panday stated the following:

Our ultimate goal is to reshape Trinidad and Tobago into Total Quality Nation that is second to none on the planet. . . . The fundamental aim of that Revolution is to ensure that all citizens, particularly our young adults are provided with the relevant quality education, training, attitudes and technological skills that will enable our full and effective participation in the information based global economy (Panday, 1998, n.p.).

The Prime Minister's statements reflect the government's need to modernize Trinidad and Tobago's current education system to meet the challenges imposed by a technology driven global economy and the increasing use of technology in the industrial sector of the country. They further reflect that competition in the global economy is dependent on the quality of education; whereas, the goal of education is dependent on the economy. Under these circumstances, education changes as the requirements of the economy change.

In his speech at the official opening and solemn blessing of the Father Graf Wing, March 17, 1999 Prime Minister Panday recognized the potential of human resources development. Specifically, human resources development theory suggests that education is a social investment which, in the most efficient manner, prepares human resources (students) to contribute to economic growth. The speech also places the country's human development at the center of the focal point of socio-economic development, and as such, places the education sector, in particular VTE, at the heart of the country's economic development process. Prime Minister Panday made this statement:

Every child, every adult, in every school and in every community in this country must be equipped with what the world of work will demand in the next century. Job security is now linked to skill security. Only those nations with educated people and adaptable workforce will achieve a competitive edge in the new millennium (Panday, 1999a, n.p.).

Prime Minister Panday's speech further reflects the government's commitment to education-for-all and a change in direction in which education is an economic imperative, linking the goals of schooling to the country's economic needs. It further exemplifies the changes required for educational policy--an explicit part of political policy--to become an integral part of the groundwork for future economic development.

In an address to the Development Finance Limited Investment Conference entitled "The World of Business Today--Rejuvenation," March 19, 1999 Prime Minister Panday stated, ". . . A key challenge we face is the need to speed up the pace of economic diversification and to create quality jobs on a sustainable basis." He continued, ". . . The other critical responsibility of the state in the new global order is to direct meaningful level of investment in human infrastructure. As I see it globalization is no longer a process, it is the condition that exist, and the condition in which we must function. My government's

principal objective is that we create the regulatory framework and the incentives that will enable our business community to achieve high levels of competitiveness in the international arena. This means rethinking our education and training systems, fostering and entrepreneurial culture and supporting entrepreneur initiative (Panday, 1999b, n.p.).

The Prime Minister's speech reflects several needs: (a) preparing a well-trained and competent world-class workforce that will enhance industry productivity, profitability and competitiveness; (b) making skills training more relevant to industry's needs, while improving the effectiveness and efficiency of VTE training offered nationwide; and (c) the very poor linkages within the different sectors, and between the different sectors of the economy.

Trinidad and Tobago faces a drain that is proving more difficult to overcome than the depletion of its natural resources. Due to increased economic growth and diversification of its economic base, Trinidad and Tobago is running out of skilled people (World Bank, 1999). The primary economic problem is no longer finding enough jobs for people--it is finding enough people who have the skills for the new jobs in the energy and metal processing sectors. This situation is driving up the earnings of such skilled people and is driving down the earnings of people who lack the education, skills, talent, and inspiration that can improve Trinidad and Tobago's productivity. The dwindling number of well-qualified people entering the work force on one side, and a growing demand for people with deeper and broader occupational skills on the other, caused this dramatic change. New technologies, expanded international trade, and the increasing importance of new and small businesses drive this demand. Thus Trinidad needs better and more vocational and technical education to help its people move out of the increasingly devalued, unskilled labor force and into the skilled labor force, thereby meeting the growing needs for high-level skills (United Nations Development Project, 1998).

An assessment of the country's human resources (taking into account the availability of knowledge and skills, their relevance to the challenges outlined, the competitive advantage being sought in the global marketplace, and other human developments) reveals severe deficiencies. Despite the impressive increase in enrollment in educational and training institutes at all levels since independence, there remains an acute shortage of professional, managerial, and technical manpower. Only a small proportion of the labor force even at those levels, has had the benefit of either vocational and technical or university education. Outputs from Trinidad and Tobago's post-secondary higher level institutions, especially in the technical fields, fall far short of the requirements for sustained technological advancement.

There has been a proliferation and duplication of vocational and technical education courses and skill preparation activities along with the associated certificates, diplomas, and miscellaneous qualifications, which state and private schools and institutions have offered (see Appendixes A and B). Many occupational areas and disciplines are involved and all levels are affected from craftsman to professional. There exists no framework for establishing a coherent and harmonized VTE system. In addition, there has been no formal benchmark for determining the quality and relevance of VTE programs provided. There is also no evidence of any methodology established for

assessment of the qualifications obtained, and no planning and coordination mechanism to ensure a rational development of VTE on a national and eventually a regional level. The absence of a rational system of VTE curriculum, assessment and certification has translated into a proliferation of qualification and certification types, which has resulted in a confused public, especially among holders and employers (Karim, 1999).

Reports on education in Trinidad and Tobago, including The Ministry of Education's (n.d.) National Task Force on Education 1993-2003 White Paper, indicate there is considerable concern regarding the appropriateness of the present purpose of education and training, as evidenced in these institutions. In particular, there are questions as to whether the curricula, programs, and teaching methods provide the requisite skills and knowledge essential to meet the country's challenges. Traditionally these areas have had a strong focus on academic subjects and examinations, and have used an unintegrated approach to foster attitudes and qualities, and a desire and capacity for continuous learning and growth. There is general agreement that there is an urgent need to improve the quality of education at all levels (especially the teaching of science and technology) and to establish closer linkages with industry and the world of work.

In today's global economy, cheap labor alone is not enough to foster sustainable economic development. Labor in Trinidad and Tobago is, in any event, more costly than labor in the large countries of Asia. What gives a country its competitive edge is the quality of its labor. Nothing matters more than education. In this regard, it must be recognized that what gives Trinidad and Tobago a potential edge is not its cheap, unskilled labor, but a skilled workforce offering a better quality-to-cost ratio than its counterparts in the developed countries. The implication of all of this is that the development of human resources should be given the highest priority in Trinidad and Tobago if the country expects to continue to compete in the global economy (United Nations Development Report, 1998)

Scope and Parameters of the Study

Limitations

This study was constrained by the following limitations:

1. Participation in this study was limited to individuals who were identified by predetermined criteria.
2. Statements used in the Q-sort and Q-factor analysis were self-reported by participants.
3. The results were limited by the experts who actually chose to participate in the study.

Assumptions

For the purpose of this study the following assumptions were made:

1. For any VTE reform to be effective and efficient in Trinidad and Tobago, the educational system has to examine the culture, and trends in the country development within the context of what knowledge students need to know and apply in work settings.

2. VTE students learn most effectively and efficiently when VTE programs are linked to current and future work requirements.
3. Respondents will be able to identify potential changes needed by VTE programs so they can contribute more effectively to the nation's future economic development.

Definition of Terms

The following terms are defined as they apply to this study:

1. *Concourse* is the flow of communicability surrounding any topic from which a sample of statements is subsequently drawn for administration in a Q-sort (Brown, n.d.)

2. *Economy* is a particular system of organization for the production, distribution, and consumption of all the things human beings use to achieve a certain standard of living.

3. *Economic development* is a dynamic process that shifts resource- and productive-sector domination of economies and labor forces, to the knowledge-based service sectors. Also included in this process are many economic and social dimensions. A minimum requirement, though, is transforming the productive structure of the economy--in particular, (a) increasing the gross national product, total employment, and per capita income, (b) eradicating absolute poverty, (c) expanding the supply of food, clothing, housing, medical services, education facilities, etc. over the long term. (Norton & Alwang, 1993)

4. *Globalization* is

. . . the contested trend towards more interdependent, local, national and transnational economies and societies; the expansion of international trade and investment, production, and financial flows; the growing significance of regional trading blocs and trade agreements; a more influential role for international financial institutions and transnational corporations; far greater mobility of capital--particularly financial capital; and the overall speed of highly commodified and individualized economic, social and cultural relations into ever more spheres of human activity (Wiseman, 1995, pp. 5 - 6).

5. *Human capital* refers to

. . . the dimension in which education is seen as a process that improves an individual's skills and abilities, and therefore his or her productivity, in the workplace. Thus, to the extent that it raises the skills of workers, and therefore productivity, greater educational attainment is expected to increase an economy's output of goods and services and, more generally, to contribute to the process of economic development" (Middleton, et al., 1993, p. 39).

6. *Lifelong learning* refers to a society's commitment to continuous education or to prepare workers for changing job requirements by combining traditional knowledge with the acquisition of new knowledge and skills in formal education as well as learning that takes place in informal ways and on-the-job.

7. *P-set* is a sample of persons expected to have viewpoints pertaining to the problem under investigation.

8. *Vocational and technical education (VTE)* consists of a multiplicity of educational programs offered at different intensity levels including (a) technical institutions, (b) formal and non-formal skills training, and (c) programs offered by public institutions, line ministries, private institutions, employers, and non-governmental organizations. *Vocational* refers to educational programs that are offered at the craft and lower levels and involves a fundamentally practical approach. *Technical* refers to educational programs that entail both a practical and theoretical emphasis that are offered at the post-secondary level and for which the entry requirements are usually secondary qualifications.

9. *World-class* is a reference to the global economy's basis for certifying product quality by measuring quality improvements. In education, the same goals prevail. Therefore, in education it is the rigorous courses involving higher order thinking and performance that emphasize the competitive context within which education is demonstrated and which results in high skills, high pay.

Chapter Summary

Many experts (Anderson & Bowman, 1976; Blung, 1984; Bowels, 1988; Middleton & Demsky, 1988; Middleton, et al., 1993; Reich, 1991; Vaughan, 1991; World Bank, 1991) and researchers (Berryman & Bailey, 1992; Chin-Aleong, 1988; Dunn, 1988; Gray, 1990; Inglehart, 1997, Petrina, et al., 1993; Rondinelli, et al., 1998, Spring, 1998) have recognized the role of vocational and technical education in the economic development of a country. As the economic activity of a country changes, VTE needs to continually refocus its efforts to provide graduates with appropriate knowledge and skills for the changing economy. These knowledge and skills can also be affected by conditions outside national borders that have been characterized by the changing patterns of trade, competition, and technological innovations in the global economy.

This study sought to determine VTE changes that are potential contributors to the economic development of Trinidad and Tobago. Described in this chapter was a conceptual framework that builds on the relationship between globalization, technological changes, and human capital investment. Also introduced were the research problem, the study purpose, limitations of the study, and definitions of terms.

As Trinidad and Tobago enters the global market a diffusion of new technologies have transformed and diversified workplaces and workforces and differentiated skills needed for success in the development of the "new" economy. However, VTE like other areas of education, is currently not positioned to address the country's economic imperatives. Outdated and irrelevant curricula and ineffectiveness in connecting education with real-world experiences are indicators that VTE outcome may be failing its economic rationale.

Chapter II

TRINIDAD AND TOBAGO: AN OVERVIEW

In chapter one it was stated that there are clear expectations for the role of vocational and technical education (VTE) in the economic development of Trinidad and Tobago. It was also revealed that there is a proliferation and duplication of VTE that affects many occupational areas, and no formal benchmark has been established for determining its quality and relevance. The information that follows builds upon the contextual framework for this study and provides a frame of reference. This chapter presents an overview of Trinidad and Tobago and outlines the country's unique characteristics and development as it attempts to enter the global arena. Specifically the country's history and culture, government, population, economic activity and education system are described.

History and Culture

Trinidad and Tobago is the southernmost country of the Caribbean Islands nations. The island of Trinidad is situated 7 miles off the eastern coast of Venezuela; the island of Tobago is situated 21 miles to the northeast of Trinidad. Both islands cover a total land area of 1,980 sq. miles about 1.5 times the size of the State of Rhode Island in the United States. Trinidad is half forested with a range of low mountains running along the northern coast. There is a flat central plain with rolling hills in the south. Tobago has a central spine of hills rising to 1,860 ft. with flatter land in the south.

Christopher Columbus rediscovered Trinidad in 1496 during his third voyage, and Spanish colonizers settled the island a century later. The Spanish colonizers largely wiped out the original inhabitants, Arawak and Carib Indians, and the survivors were gradually assimilated. Although Trinidad attracted French, free African slaves, and other non-Spanish settlers, the island remained under Spanish rule until captured by the British in 1797. It formally became a part of the British Empire in 1802. Under Spanish rule, Trinidad remained sparsely populated due to the lack of mineral wealth; however, sugar cane, coffee, and cocoa were cultivated.

In contrast, Tobago development was quite different from that of Trinidad. Tobago was nearly deserted by the Spanish, and the island development was similar to other plantation islands in the Lesser Antilles. During Tobago's colonial period, the French, Dutch, and British forces fought over possession, and the island changed hands 22 times, more often than any other Caribbean island. Tobago was finally ceded to Great Britain in 1814 and was administratively enjoined and then politically linked to Trinidad as a joint colony in 1890. Both islands remained under British rule until they gained independence in August, 1962.

The people of Trinidad and Tobago are mainly of African or East Indian (India) descent. Virtually all speak English; small percentages also speak Hindi, French patois, and several other dialects. Trinidad has two major folk traditions: Creole and East Indian. Creole is a mixture of African elements with Spanish, French, and English colonial culture. Trinidad's East Indian culture came to the island with indentured servants who

were brought to fill a labor shortage created by the emancipation of the African slaves in 1833. Most remained on the land, and they still dominate the agricultural sector, but many have become prominent in business and the professions. East Indians have retained much of their own way of life, including Hindu and Muslim religious festivals and practices.

Government

Trinidad and Tobago is a unitary state, with a parliamentary democracy modeled after that of the U.K. From 1962 until 1976, Trinidad and Tobago, although completely independent, acknowledged the British monarch as the figurehead chief of state. In 1976, the country adopted a republican constitution, replacing Queen Elizabeth with a president elected by parliament. The general direction and control of the government rest with the cabinet, led by a Prime Minister and answerable to the bicameral parliament. The legislature consists of an elected House of Representatives and an appointed Senate. The Tobago House of Assembly has extensive power in Tobago. It is composed of eight elected members and two nominated members and is led by a chief secretary.

Population

The population of both islands was 1,175,523 as of July, 2000, with Tobago accounting for 50,000. The roots of the population can be traced back to Africa (40%) and India (42%); Europe, the Mediterranean, the Middle East and China account for a mixed population of 18%. The country has a projected population growth rate of 0.49% (according to a year 2000 estimate) and a birth rate of 13.84 births per 1,000 population (2000 est.). Its death rate is 8.84 deaths per 1,000 population (2000 est.) and its net migration rate of -9.92 migrant(s) per 1,000 population (2000 est.). The country has an infant mortality rate of 25.76 deaths per 1,000 live births (2000 est.) and a life expectancy at birth for the total population of 67.97 years, with male life expectancy being 65.45 years compared to 70.59 for females.

Economic Activity

Trinidad and Tobago has the most diverse economy of all the islands in the Caribbean and is very sophisticated for a country of its size. Endowed with relatively rich deposits of crude oil and natural gas, Trinidad and Tobago became one of the most prosperous countries in the Western Hemisphere during the oil boom of the 1970s. Oil revenues allowed the government to embark on a rapid industrial and infrastructure development program. Part of this was the acquisition of more than 60 state-run enterprises, most of which eventually became a serious drain on public finances with the collapse of oil prices in the early 1980s. With the help of stringent adjustment programs, beginning in 1988, Trinidad and Tobago's economy shifted from central planning to one of free market policies, with extensive trade and investment liberalization, divestment of state enterprises, and an emphasis on economic diversification and export-led growth. Today, Trinidad and Tobago is regarded as having the second most liberated energy sector after Argentina. With five billion dollars in U.S. foreign direct investment between 1996 and 2000, it is the largest recipient of United States direct investment, after Canada in the Western Hemisphere. Trinidad and Tobago's economic activity can be divided into

five sectors: agriculture, energy, manufacturing, financial and related services, and tourism. Each of these is discussed in the sections that follow.

Agriculture

Trinidad and Tobago was highly developed as a producer of sugar, coffee, and cocoa on the plantations of the 17th and 18th centuries, but the importance of agriculture declined with industrialization. Although it has remained an important source of employment, agriculture accounted for only 1.9% of the gross national product (GNP) in 1999. The agricultural sector is dominated by sugar; however, the State-owned agriculture firm Caroni (1975) Ltd., has diversified into rice, citrus, and aquaculture farming with limited success. Sugar is exported to the European Union and the United States on preferential terms. Other crops of significance are citrus fruit, cocoa, coffee, and flowers. Rice and other food crops are grown for local consumption, but the country imports 75% of its food.

Energy

Trinidad and Tobago remained largely an agricultural colony under the imperial governments of Spain and Britain until crude oil deposits were discovered in Trinidad in 1866. This discovery changed the direction of the country's economic development, in particular the island of Trinidad, through the commercialization of the petroleum industry. Crude oil production began in 1908, and a refinery was established in 1912. Marine drilling began in 1954, off Trinidad's west coast; and in 1959 commercialization of natural gas began with the establishment of the first ammonia plant. In 1968, the first commercial oil and gas discoveries were made off Trinidad's east coast.

The energy sector of Trinidad and Tobago is the largest sector of the economy in the country. While during the last 20 years the government has been able to diversify the country's economy, the crude oil and natural gas sector still remains the prime engine of growth and the catalyst of industrial development. In 1998 this sector contributed 26% of GDP, 70% of foreign exchange earnings, and 22% of the total government revenue. Moreover, it provided employment for about 10,000 employees. Although the government, with the help of several foreign oil companies, is pursuing an aggressive oil exploration and exploitation campaign, natural gas is rapidly replacing oil as the foundation of the economy. It has become the input for ammonia, urea, methanol, iron carbide, and steel production. Multi-national U. S. corporations dominate the oil, gas, and petrochemical sectors. Natural gas is used for (a) the manufacture of petrochemicals such as ammonia, methanol and urea; (b) electricity generation; (c) steel and metal production; and (d) cement manufacture and light industry. Petrochemicals have recently taken on increased importance. Today ammonia and methanol comprise 64% of gas utilization in the country. Power generation comprises 25%, and the industrial sector (including steel manufacture) uses the remaining 16%.

Manufacturing

Manufacturing and processing industries accounted for 10% of Trinidad and Tobago's GDP in 1999, and is the second highest source of employment. The product groupings that have experienced the most success and the largest growth in exports are

(a) beverages, (a) miscellaneous manufactured articles, (c) chemicals, and (d) manufactured goods and food. Within the last 20 years the government has set up joint ventures with foreign capital to produce steel, with plans for a new rod and flat sheet mill that will more than double current output. Additional joint ventures include petrochemicals, cement, ammonia and other nitrogenous fertilizers, and urea and methanol.

By 1999 Trinidad was home to nine ammonia plants, five methanol plants, one urea plant, one iron ore and steel mill (including two Midrex direct reduction iron plants). Its nine ammonia and five methanol plants enabled Trinidad to become (a) the number one exporter of ammonia, with 300 million tons exported annually, and (b) one of the largest methanol exporters of the world. A new methanol plant is scheduled for completion in the early part of the year 2002, with a production capacity of 1,850 metric tons per day (Manmohan, 2000). The government is improving the heavy industry infrastructure at the Point Lisas Industrial Estate, where a direct reduction iron plant is also being built. The country also assembles motor vehicles and produces consumer durables and garments. In addition, there is a growing printing industry. A number of new gas based and related projects are under discussion and development. These projects include (a) iron ore reduction, (b) electric generation for the manufacture of steel and aluminum, (c) methanol and ammonia production, (d) gas-to-liquid conversion, and (e) ethylene and liquefied natural gas production.

Financial and Related Services

The services sector--banks, insurance firms, and other financial institutions, as well as trading and distribution companies--accounted for 58.3% of the GDP in 1999 and 75% of the total employment. Financial services have become particularly important, accounting for 11.5% of GDP. The country's stock exchange was rated the fifth fastest growing in the world in 1998.

Tourism

Tourism is Trinidad and Tobago's fourth-largest foreign exchange earner, accounting for about 3% of GDP (mostly in Tobago). It is targeted for expansion and is rapidly growing in the pleasure boat and eco-tourist segments. Trinidad and Tobago purchases a broad range of goods and services abroad, 38% of them from the U.S. which, in turn, buys 44% of Trinidad and Tobago's exports. Policy changes designed to make Trinidad and Tobago more attractive to foreign investors have been implemented, including privatization of state firms, revisions of tax and tariff rates, and removal of import restrictions on nearly all products.

According to the Trinidad and Tobago Central Statistical Office, real GDP growth averaged 2.3% in 1995, following on 3.5% growth in 1994--a marked improvement after a decade of economic decline. Debt-service payments, inflation, and most other macroeconomic indicators have also improved dramatically over the past several years. Between 1994 and 1998, real GDP grew by an annual average rate of 3.5%, spread over both the oil and non-oil sectors. Over the same period, the inflation rate averaged 5.3%. The unemployment rate fell from 18.4% in 1994, to 14.2% in 1998. Persistent unemployment of over 10% remains one of the chief challenges for the government (See

Table 1). When compared by gender, females accounted for approximately 38% of the total labor force and 30% of the employed labor force; moreover, they had an average unemployment rate 6% higher than males. Trinidad and Tobago's labor force varies by educational attainment. As shown in Table 2, the largest segment of the country's labor force has had some form of secondary education with the majority of participants having the benefit of some form of training in addition to their secondary education.

Table 1. Trinidad and Tobago's Main Labor Force Indicators

Main Labor Force Indicators	1993	1994	1995	1996	1997	1998
Labor Force ('000)	504.5	509.5	520.9	530.3	541.0	558.7
Male	318.1	319.2	326.9	325.7	335.8	344.6
Female	186.4	190.3	194.0	204.6	205.2	214.1
Employed Labor Force ('000)	404.6	415.6	431.5	444.2	459.8	479.3
Male	261.8	267.7	277.5	282.5	294.5	305.5
Female	142.8	147.9	154.0	161.7	165.3	173.8
Unemployed Labor Force ('000)	99.9	93.9	89.4	86.1	81.2	79.4
Male	56.2	51.5	49.5	43.1	41.3	39.1
Female	43.7	42.4	39.9	43.0	39.9	40.3
Levels of Employment ('000)						
Under 25 years	36.7	35.9	35.2	33.9	32.4	33.0
Male	20.1	20.0	19.7	16.9	16.7	17.3
Female	16.7	15.9	15.5	17.0	15.7	15.7
25 years and older	63.2	58.0	54.2	52.2	48.8	46.5
Male	36.1	31.5	29.8	26.2	24.6	21.8
Female	27.0	26.5	24.4	26.0	24.2	24.7
Unemployed Rate %	19.8	18.4	17.2	16.2	15.0	14.2
Male	17.6	16.1	15.1	13.2	12.3	11.3
Female	23.4	22.3	20.6	21.0	19.4	18.9

Note: Government of Trinidad and Tobago Central Statistical Office (1999), Trinidad and Tobago.

Table 2. Trinidad and Tobago's Labor Force by Educational Attainment

Educational Attainment	Labor Force ('000)			
	1995	1996	1997	1998
No Education	4.6	3.6	3.7	2.8
Elementary	249.7	241.5	243.2	234.9
less than Grade 5)	19.5	15.3	14.6	13.5
Grade. 5 and above)	105.0	103.5	99.4	100.9
with Training	125.2	122.7	129.4	120.5
Secondary	322.5	336.0	337.6	357.8
no subjects	58.5	57.0	56.6	50.0
no subjects + training	96.9	98.6	99.8	104.6
less than 5 subjects	25.6	25.1	23.6	27.6
less than 5 subjects + training	62.8	69.7	69.3	68.9
5 or more subjects	20.2	19.3	17.8	21.6
5 or more subjects + training	58.5	66.3	70.5	85.1
University Education	33.1	34.5	36.1	34.3
no degree)	1.5	1.2	1.6	1.4
Degree/Diploma/ Cert.	31.6	33.3	34.5	32.9

Note: Government of Trinidad and Tobago Central Statistical Office (1999), Trinidad and Tobago.

Education

Schooling was first introduced to Trinidad and Tobago by European missionaries to the native Amerindian population as a means to afford them the benefit of Christianity. However, it was not until 1845 with the arrival of the indentured laborers from India that the foundation for a formal educational system was laid. Missionary groups began to provide rudimentary education for the Indian (Asian) population. By 1873, 12 schools were established through the joint effort of plantation owners and Christian missionaries. The teachers were mainly Canadian women during the early stages of this formal educational system, and by 1894 a formalized teacher-training program similar to the Canadian normal school was established by the Presbyterian Church (Alleyne, 1996).

The first secondary school was established by the Catholic Church in 1836 (Carmichael, 1961) as a finishing school for young ladies of European background. It was not until 1869 that the British colonial government allocated public funds for the establishment of secondary schools. These early secondary schools had an "elite" orientation based on the traditional English grammar schools. The curricula offerings included mathematics, Latin, Greek, French, German, English language and literature, and English history and geography. No practical or VTE subjects were offered (Gordon, 1963).

VTE was officially first offered in 1906 through the Board of Industrial Training which in 1943 established a Junior Technical Institute to prepare students for the London City and Guilds Examination. By 1962 the government had built 10 secondary modern schools, despite the Committee on General Education Report (1959). The Committee's

report underscored the role of Trinidad and Tobago's educational system in linking technical subjects to the economic development of the country. "A nation's industry can grow and expand just as its education system can supply it with the trained personnel needed for its growth and expansion . . . more and more projects are requiring the use of engineering skills." The report stressed the value of VTE programs to be aligned to the economic development of Trinidad and Tobago. It also provided the principal rationale for VTE in Trinidad and Tobago--a rationale rooted in the notion that the kinds of jobs necessary for modern development and created by technology, require specialized skills. Furthermore, these specialized skills can best be taught and delivered to the labor market by way of formal programs developed and pursued at secondary and post-secondary institutions. This belief holds that, in addition to being beneficial to the individual, VTE also develops the country's economy as a whole.

During the 1970s the Government of Trinidad and Tobago made relatively heavy investments in education, especially in VTE. Responding to the needs of expanding economies and to raising aspirations, the government built schools and trained teachers as a priority. In the latter half of the 1980s policy makers were faced with fiscal austerity and eroding school quality. At the same time the increasingly demanding and complex marketplace required revitalized VTE capacity. While formally the priority was expanding VTE opportunity, the priority transformed during the latter half of the 1990s and has now become restoring and enhancing VTE quality.

While Trinidad and Tobago may have achieved universal basic education at the primary school level, it has not attained the status whereby all students obtain high school diplomas, a current prerequisite for gainful employment (See Tables 3). Trinidad and Tobago differs from many other countries in that compulsory schooling ends at age 16, thus making it possible for many students to leave school before successfully completing high school education. Also, until 1999, the common entrance exam (administered to all primary school students between the ages 11 and 12) screened out between 8,000 and 12,000 students from public secondary school education.

Academic standards in Trinidad and Tobago also differ in another important respect. Whereas the national education systems in the distant and recent past have focused entirely on cognitive outcomes, Trinidad and Tobago's political and educational leaders are now speaking about what students need to "know and be able to do." Thus considerable attention was paid to skills such as reading, writing, and calculating as well as cognitive knowledge.

Table 3. Student Enrollment in Government and Assisted Schools

School Classification	Student Enrollment by Academic Year			
	1994/95	1995/96	1996/97	1997/98
Elementary	191,640	185,898	181,003	176,218
Government Secondary	14,927	16,455	16,321	17,735
Assisted Secondary	19,304	19,602	20,103	20,530
Junior Secondary	36,671	34,795	35,192	33,328
Senior Comprehensive	23,938	24,002	24,102	26,207
Composite Schools	7,932	8,024	8,148	8,388
Technical and Vocational	4,135	4,639	4,221	3,935
University of the West Indies (St. Augustine, T&T Students)	4,137	4,655	4,480	5,378

Note: Government of Trinidad and Tobago Central Statistical Office (1998), Trinidad and Tobago.

The growing emphasis on standards in Trinidad and Tobago can be viewed in two ways. In the broadest sense, it reflects the growing focus on educational quality. As in other nations in the Caribbean, there is a growing recognition in Trinidad and Tobago that issues of access cannot be separated from concerns about the quality of the teaching and learning to which students are rapidly gaining access. While standards legitimize the setting of explicit objectives towards which students, teachers, and the whole school can strive, they embody goals that are not only ambitious, but gain credibility by the fact that they reflect a broad consensus.

It is not surprising that ongoing change in emphasis on education direction has produced heated discussions about curricula content and the push for a border definition of educational quality. As Haddad (1999) stated in a recent paper,

To be deprived of basic education is to be deprived of the essential tool for modern day living. Without the skills too participate in a literate, technological world and the knowledge to transform their environment, people will remain on the margins of society, and society itself will lose their potential contributions (p.12).

Thus, in Trinidad and Tobago, knowledge and skills previously obtained by a portion of the students are now becoming minimal requirements for all students, and the learning goals for superior students are getting to be more complex and sophisticated than ever before.

Much of the debate over content focuses on the relevance of traditional curricula. The government of Trinidad and Tobago argues that educational content that was suitable for a pre-industrial society is no longer adequate. This can be attributed to today's information/technology driven society and the diversification of the country's industrial sector. Whereas schools used to be able to equip students with the knowledge and skills that would serve them for a working lifetime, this is no longer possible in workplaces characterized by continuous changes in a competitive global environment due to globalization and the increasing use of technology.

In such an environment, educational outcomes and standards must move beyond national boundaries into the international arena. A holistic structure of knowledge and skills is therefore necessary. As Haddad (1999) has noted,

The diversification economic, social, and political demands on education leave countries with no choice but to invest in building the whole structure of knowledge and skills. With such profound changes in technology and the economy, a country forgoes the opportunity for advancement when it focuses on one level to the disadvantage of others. The workforce of the future will need a whole spectrum of knowledge and skills to deal with technology and the globalization of knowledge. It will also need to be agile and flexible, to adjust to continuous changes, both economic and social. This means that countries must embrace a holistic approach to education, investing in building the whole pyramid of knowledge and skills concurrently. Each level in the structure has its own importance, and one cannot be traded for another (p. 7).

Pre-Kindergarten and Early Childhood Education

Pre-kindergarten and early childhood education is conducted under the aegis of the Ministry of Education, the Trinidad and Tobago Association of Village/Community Councils, Service Volunteered for All (SERVOL) and the effort of entrepreneurs/private centers. The Ministry of Education has the overall responsibility for pre-kindergarten and early childhood education policy and programs. This responsibility is discharged through its Preschool Division that provides technical assistance, supervisors and delivery of the curriculum and interviews and selects staff. In an effort to establish a foundation for sound educational development by the government of Trinidad and Tobago, the National Council for Early Childhood Care and Education (NCECCE) was established in 1989 to coordinate the activities of the various bodies providing early childhood education. The NCECCE was mandated to manage the provision of early childhood care and education. One of their initial tasks was the preparation of a detailed project proposal for the medium- and long-term resourcing and researching of this educational sector.

At the end of the academic year 1998-1999 there were 142 government-funded Early Childhood Care and Educational Centers providing education for children up to age five. These institutions accounted for a total enrolment of 4,721 students. The rest of the cohort either attended private pre-school or stayed at home.

Elementary Education

Trinidad and Tobago had 477 government-operated elementary schools by the end of the academic year 1998-1999. Presently, 88% of all 5-year-olds enter the public educational system at the elementary level; the remaining 12% attend private elementary schools. A United Nation (UN) study (1996) indicated that the proportion of children entering grade 1 of primary school who successfully completed grade 4 consisted of 91% male and 94% female of the school age population respectively. This data suggests that Trinidad and Tobago is well on the way to achieving access to basic education in the near future, one that in the elementary years, is equitably provided to both sexes. The UN

study also indicated that a proportion of children in each grade dropped out of elementary schooling (see Table 4).

Table 4. Proportion of Children in Each Grade who Drop out of Elementary Education

Gender	Average percent of children who drop out of elementary education each year						
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7
Male	0.4	0.5	0.5	0.5	0.5	0.7	2.1
Female	0.4	0.6	0.6	0.6	0.6	0.6	1.6

Note. Ministry of Education, (1999) Trinidad and Tobago

Up to the year 2000, all elementary school students between the age of 11 and 12 years were required to write the Common Entrance Examination (CEE) to determine their placement in the public secondary school of their choice. The CEE was replaced by the Secondary Entrance Examination (SEE) in 2001, and approximately 22,000 elementary students were registered to write the exam. The SEE will test students in Mathematics, Language Arts, and Creative Writing.

In 1999, 30,339 elementary students wrote the CEE competing for 21,239 secondary school places. Approximately 5,000 students secured places in the “traditional” secondary school sector and over 16,000 were placed in the “new” sector. Some of the students who didn’t secure a place in the government’s secondary schools entered post-elementary centers where they were required to write the post elementary examination after two years of study. Success at this level gained the student a place in a “new” sector secondary education school. The remaining students either returned to their former schools and retook the CEE in 2000, or attended a private secondary school. In 1999 approximately 4,000 students returned to their former schools as re-sit candidates for the CEE 2000 examination. Usually six percent of elementary students drop out of the formal education system at this point and enter non-formal specialized craft apprenticeship (Ministry of Education, 1999).

Secondary School Education

Trinidad and Tobago’s secondary level of education may be divided into two sections. The traditional section, inherited as a result of British colonization, includes government and government-assisted schools. These are five- to seven-year secondary schools that concentrate on traditional academic subjects. After five years of schooling at this level, students write the Caribbean Examination Council (CXC) examinations set by the regional examination body. The Cambridge A-Level examination is written after an additional two years of schooling.

The “new” sector, which was introduced in 1972, comprises four types of government schools: junior secondary, senior secondary, senior secondary comprehensive, and composite. These schools provide secondary education in two levels. The first level at the junior secondary schools consists of three years of general secondary education for the 11-plus age group. These schools provide a broad program that includes

coursework in general education with a technical-oriented curriculum of industrial arts, home economics, music, arts and crafts, and agriculture science.

The second level at the senior secondary and senior secondary comprehensive schools are for students in the 15 to 18 age group who have completed their first three years of secondary education at the junior secondary schools. The principal aim of these schools is to provide a diversified curriculum consisting of traditional academics, specialized crafts, pre-technical, and vocational and technical education courses to their students. Students at the senior secondary and senior secondary comprehensive schools are prepared for the CXC general proficiency examination and the National Examinations Council (NEC) craft examinations. The duration of the program at this level is two years, but some schools offer two additional years for students pursuing the Cambridge A-Level Examination after successfully completing the CXC general proficiency level of education.

The composite schools (combine both junior and senior comprehensive school in a single location) provide five years of secondary education and offer a choice of courses in academic, pre-technical, and vocational and technical subjects. However, as of the year 2000 all the government schools--junior secondary, senior secondary, senior secondary comprehensive, and composite--were being converted through the Secondary Education Modernization Program (SEMP) to provide a minimum of five continuous years of secondary education. In addition, vocational and technical craft subject areas are to be gradually phased out from the curriculum of these schools and relocated in post-secondary institutions (IDB, 1999). This change in education policy has developed in large part because of the widespread belief in Trinidad and Tobago's economic sectors that schools do not provide students with the level of education they need to be competitive workers, citizens, and family members in the years ahead as the country continues to diversify and expand its economic base.

Vocational and Technical Education

Vocational and technical education and training are available to all students who attend the junior secondary schools, senior comprehensive schools, technical institutes, vocational centers, and the hospitality institute. However, entry at the technical institute is obtained after graduating from secondary school. Coursework at the technical institute level is offered on both full- and part-time bases. Part-time coursework is designed for students employed in occupational settings who wish to update their qualifications. Full-time coursework at the craft level is usually two years, while at the technician level it is three years. All assessments and certifications from both government and private institutions at this level of education are sought through the NEC that provides the necessary accreditation for courses offered.

Curricula for craft and technician courses at the senior comprehensive and technical schools are developed at the national level. Curriculum officers develop curriculum with support from specific advisory committees and using the DACUM approach. Curriculum officials who supervise specific vocational and technical subjects in the schools developed the junior secondary school curricula. The CXC provides technology course curricula for students in government-assisted and senior secondary schools.

The Vocational and Technical Education and Training Division is headed by a Permanent Secretary, who advises the Minister of Education on vocational and technical education and on training matters. Business education is an integral aspect of the vocational and technical education and comes under the purview of the Division. The government finances programs that provide payment (a) of salaries for teachers and other support staff, and (b) for materials and equipment in workshops. At the government institutions, students do not pay tuition fees, except for a minimal application fee for entry into the technical institute. However, students who attend the Hospitality Institute are required to pay a very small tuition fee, while the major part of the cost is borne by the government.

The mechanism for linking job development and VTE is the National Apprenticeship Program, a placement system designed for unemployed youth between 15 and 25 years. Students enrolled in post-secondary training institutions are placed in industry for practical training during the summer vacation. The National Apprenticeship Program provides both short- and long-term apprenticeships for applicants in a range of occupational areas. The apprenticeship period may range from six months to three years, depending on the skill area. For the past two decades, it has become more apparent that the options for tertiary education need to be expanded because Trinidad and Tobago lagged behind its regional counterparts. To correct this situation, several Government Ministries joined with industry to provide VTE training (see Table 5).

This collaboration resulted in the development of the National Energy Skills Center (NESC); National Skills Development Program (NSDP), Metal Industries Company (MIC); Youth Training Program (YTEPP), and SERVOL. Some of these organizations offer VTE programs geared for the needs of the energy sector and heavy industry in general (see Table 6). In addition, the VTE training that is offered to potential entrants is being optimized to ensure that quality and quantities are maintained at all time.

To further alleviate the problem, the College of Science, Technology and Applied Arts of Trinidad and Tobago (COSTAATT) was formed by Cabinet decree in January 1999. Since then, the Community College Implementation Team (CCIT) has coordinated the initial phases of the development of COSTAATT and launched seven colleges as a fully functioning entity in September 2000.

Table 5. Trinidad and Tobago Governmental Ministries Conducting Vocational and Technical Education and Training Programs

Governmental Ministry	Training Program
Ministry of Agriculture	Eastern Caribbean Institute of Agriculture and Forestry (ECIAF) Farmer's Training Center
Ministry of Education	Government Vocational Centers. Adult Education Unit
Ministry of Energy	National Energy Skills Center
Ministry of Information, Training, Communication, and Distance Learning	Youth Training and Employment Partnership Programs Metal Industries Company (MIC)

Ministry of Local Government	National Skills Development Programs (NSDP)
Ministry of National Security	Community Based Distance Learning Centers
Ministry of Social and Community Development	Unemployment Relief Training Program
Ministry of Youth	Joint Services Staff College
	Community Development
	Youth Development Apprenticeship Centers (YDACs)

Note: Fazal, K. (1999). *Trinidad and Tobago country paper*. Presented at ILO-TVET meeting St. Lucia October 27–29, 1999. Trinidad and Tobago, International Labor Organization. Reprinted with permission.

To further alleviate the problem, the College of Science, Technology and Applied Arts of Trinidad and Tobago (COSTAATT) was formed by Cabinet decree in January 1999. Since then, the Community College Implementation Team (CCIT) has coordinated the initial phases of the development of COSTAATT and launched seven colleges as a fully functioning entity in September 2000.

The objectives of COSTAATT are fourfold: (a) to offer relevant, state-of-the-art, internationally recognized tertiary level education and training, producing graduates who are “ready for the world of work”; (b) to broaden access to higher education to previously under-served groups and communities throughout Trinidad and Tobago; (c) to increase the participation rate in tertiary education to 15% by 2005, as recommended by CARICOM; and (d) to contribute to the reduction of unemployment, the creation of opportunities for the youth, and the support of national development.

COSTAATT offers relevant, hands-on tertiary training and associate degrees. Along with certificates and diplomas, COSTAATT will be awarding associate degrees, producing highly trained graduates with theoretical and hands-on skills, ready to make a valuable contribution in the world of work, or to pursue further degrees.

Table 6. Trinidad and Tobago’s Main Vocational and Technical Education Providers

Main VTE Training Providers	Enrollment			
	1995	1996	1997	1998
Youth Training Partnership Program (YTEEP)	13,511	10,330	10,021	8,166
Metal Industries Company (MIC)	488	689	643	663
National Energy Skills Center (NESC)	NA	NA	NA	611
T & T Hospitality and Tourism Institute (TTHTI)	NA	NA	217	329
SERVOL	3,387	3,669	3,887	4,052
Unemployment Relief Training Program (URTP)	NA	NA	1,568	7,582

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National Energy Skills Center was established in 1997; T & T Hospitality and Tourism Institute was established in 1996.

Essentially, COSTAATT brought several existing tertiary level institutions under one umbrella. Each of the tertiary level institutions is upgraded to (a) offer uniform high standard tertiary VTE, (b) facilitate greater access, and (d) increase responsiveness to community needs. There are plans to establish a Wide Area Network linking the campuses, and develop distance learning capabilities in the near future.

The tertiary learning institutions, which formed COSTAATT are (a) Eastern Caribbean Institute of Agriculture and Forestry (ECIAF) (b) John S. Donaldson Technical Institute (JSDTI), (c) Joint Services Staff College (JSSC), (d) Metal Industries Company (MIC), (e) Government Vocation Center (GVC), (f) San Fernando Technical Institute (SFTI), and (g) The NIHERST Colleges--Nursing, Health Sciences, Information Technology & Business Management, School of Languages, and General Education Division.

COSTAATT offers a wide range of academic and training programs on both a credit and non-credit basis in 14 disciplines: Agricultural Teacher Education, Agriculture and Forestry, Allied Health Sciences, Applied Foreign Languages, Building and Construction, Business Studies, Criminal Justice, Engineering Technology, Food Services, Graphic Arts, Information Technology, Nursing, Office Administration, and Technical/Vocational Teacher Education

Traditionally, most people who are able to gain entry to tertiary education are those with the standard “full” CXC/GCE passes (6 subjects). But many of those with five CXC/GCE passes are still having a difficult time accessing tertiary education and training. The College is addressing the needs of these people and those who do not have the standard entry qualifications who could benefit from its programs. COSTAATT seeks to make it possible for such persons to obtain another chance to further their education.

Trinidad and Tobago have become caught up in a process of global rearrangement and economic restructuring, in which it is not possible to evaluate VTE and what is happening to it without also involving the backdrop of the wider set of global forces shaping and molding it. In part, Trinidad and Tobago’s policy for its global rearrangement and economic restructuring has spurred the following changes:

1. The separation and removal of VTE, in 1999, from under the umbrella of the Ministry of Education and into the Ministry of Finance, Planning, and Economic Development.
2. Development of a National Training Agency (NTA) in 1999 to monitor and coordinate VTE and training.
3. Establishment of a Secondary Education Modernization Program
4. Conversion of seven post-secondary technical schools into community colleges in the year 2000
5. Re-examination of the national standardized vocational qualifications for courses in VTE.

The challenge for the NTA is multi-faceted: (a) Streamline the vast number of training programs and certification being awarded locally; (b) develop a skilled and adequate workforce that is responsive to the pace of global and technological change; and (c) address the present mismatch between training programmers and employers' needs (NTA, 2000).

In an effort to maintain its focus, the NTA has implemented a program called "Training 2000--National Thrust in Skills Training." The purpose of Training 2000 is to upgrade and revitalize technical and vocational education and training. Specifically, the program is designed to (a) make skills training relevant to industry's needs, while improving the effectiveness and efficiency of training offered nationwide; (b) meet industry's occupational standards, which are on par with regional and international standards, and (c) preparing a well-trained and competent workforce that will enhance industry productivity, profitability and competitiveness (NTA, 2000).

University Education

The University campus at St. Augustine is part of the University of the West Indies (UWI)--an autonomous regional institution supported by and serving 14 different countries in the Caribbean. The institution came into being as the University College of the West Indies under a royal charter in 1948, and was granted university status under the Royal Charter of Incorporation in 1962. Up to 1962, the University College did not award degrees. However, by special arrangement with the University of London, the University College taught for degrees using syllabuses modified to meet the Caribbean needs. In 1962 the University College became an independent university and students began to read for degrees of the University of the West Indies.

The St. Augustine campus was started in 1960 by taking over the Imperial College of Tropical Agriculture. Today, this campus offers several programs at the undergraduate, graduate, and doctoral level of education. Degrees can be obtained in agriculture, arts and general studies, education, engineering, law, computer science, medical science, natural sciences, and social sciences. Entry requirements for undergraduate studies vary by school as prospective students for direct admission to some degree courses are required to have obtained qualifications in certain specific subjects at specified levels. Some schools require matriculation for admission to degree courses with passes in five subjects of which at least two must be at the Advanced Level while others requires passes in four subjects of which at least three must be at the Advanced Level. All school requires prospective students to have a passing grade in English. In addition, prospective students for direct admission to some degree courses are required to have obtained qualifications in certain specific subjects at specified levels.

Applications for admission to the master's degree program are required to hold at least a second class degree from an approved university. Master's degree are awarded on the basis of course work, written examinations, and a research paper, the length of which varies depending on the program. Applicants for the doctoral degree programs are required to have a Masters degree or seek entrance into the Master of Philosophy program, in the first instance, and then have their registration transferred to the Ph.D. on providing evidence to their department of their ability to undertake independent research. Applicants for the doctoral degree programs with a Master's are required to submit in

writing to the appropriate departments a detailed proposal of the research they wish to undertake within six weeks of notification of acceptance.

Summary

The overview of Trinidad and Tobago revealed that while the country has the most diverse economy of all the islands in the Caribbean, it is heavily dependent on oil. Thus the fluctuating world price of oil has a major impact on economic activity and governmental spending. Diversification of its oil sector to include the development of natural gas based industries is slowly benefiting the economy, however like oil, natural gas industries are capital intensive and do not employ large number of employees. Today, the energy sector continues to be the prime catalyst for economic and industrial growth and development for the short, medium and long term. However, several factors have contributed to Trinidad and Tobago's development. These factors include the abundance of natural gas reserves, fairly attractive flexible gas prices, a very stable political climate, an established judicial system, a competitive, attractive fiscal incentive regime, an outstanding geographic location between North America, Central America, South America, and Europe, and a literate workforce.

The strong relationship between VTE and economic competitiveness has been generally accepted at the national level, and concerns over continued economic growth have provided the primary motivation for the school (education) reform movement currently taking place. Thus, there is a potential for high quality VTE to meet the changing requirements of the country's economic development. The linkage between education and economic development was founded upon the notion that VTE has the potential to make a significant contribution to increasing the wealth of the nation. In recent years, questions that are related to education in general and the quality of VTE in particular have become increasingly prominent in discussions of economic development.

Chapter III

REVIEW OF RELATED LITERATURE

The purpose of the literature review was twofold: (a) to search for and explore information pertinent to the role of VTE in the economic development of a country, and (b) to examine issues concerning the linkage between VTE and economic development in the global arena. This chapter categorizes the results of the review process into three sections. The first section--globalization and economic development--focuses on the linkage between globalization and economic development and the resultant impact on the small economy of Trinidad and Tobago. The second section--vocational and technical education and economic development--examines the role of VTE in economic development within the context of developed and developing countries. Finally, the third section--Q-methodology--presents a review of the literature for Q-methodology.

Globalization and Economic Development

During the past two decades, the decline of Fordism and subsequent rise of globalization has resulted in increased interaction among countries through world trade, foreign direct investment, and capital markets (Kincheloe, 1999). Because of the impact of globalization, experts estimate that since the mid-1980s trade between developing and industrialized countries has been growing at 10% per annum; trade among developing countries themselves, at 12% per annum (Woodward, 1996). Encouraged by the increased opportunities for investment and trade offered by globalization, Trinidad and Tobago embarked on two major initiatives. First it liberalized foreign investment and trade regimes. Second, it implemented domestic micro-economic policies designed to (a) augment its export capacity and (b) facilitate its integration into the world economy.

The core force behind all of these changes was intellectual capacity. Intellectual capacity is measured by the degree to which firms, organizations, and nations develop widespread absorptive capacity and support lifelong learning, thereby creating organizational cultures which not only support learning and sharing of knowledge, but also facilitate creativity and innovation as well. In both developed and developing countries, the key to achieving these successes has been the emphasis placed on VTE. The significance of VTE cannot be overemphasized in a global economy that has identified sustainable development as the only rational and reasonable approach to the dilemma of development in an interdependent, interconnected world.

Inasmuch as companies in this interconnected world could rapidly shift their centers of production across national borders, globalization became a challenge to economic development policies. The result was more intensive competition among firms in all countries, and between developed and developing nations (McClean, 1995 & Kincheloe, 1999). The response was two-fold: first, industry began changing its character through the organization of work and the types of skills used within occupations. Soon a wide range of jobs required increased information-handling skills, spurring the demand for workers with multiple skills--including flexible specialists with strong social skills, such as the ability to work in teams, exercise initiative, and interact with clients or

customers. Second the pace of change began to increase as technology advanced, leading to obsolescence of VTE programs designed around tightly defined skills.

Globalization also impacted the labor market, as new technological developments led to significant changes in the relationship between labor and production. Croft and Beresford (1992) summarized this labor/production relationship as a set of developments and changes that moved “from standardization, uniformity and universals to fragmentation, diversity and difference” (p 26). At the economic level, this was characterized by a trend towards differentiation in both production and consumption: (a) from the mass production line to semi-autonomous work groups, (b) from standardized products to diverse products aimed at various specialized groups of consumers, and (c) from a production-led to a consumption-led economy.

Smyth and Shacklock (1998) characterized the labor/production relationship resulting from globalization, as the hallmarks of change:

. . . flexible forms of production and restructured workplace organization; greater reliance on market forces as the mode of regulation, rather than the rule, regulations and centralized bureaucratic form of organization; greater emphasis on image and impression management as a way of shaping consumer choice; decentralization of control in contexts where responsibility for meeting production is developed; resorting to increasingly technicist way of responding to uncertainty; and greater reliance on technology as the preferred means of resolving complex and intractable social moral and political problems (p 16).

As a result, a small country like Trinidad and Tobago, was better able to closely integrate its production with the production process of large scale enterprises in the larger economies of industrial countries (Nicholls, 1998). These new production modes, combined with simultaneous growth in service industries, created a demand for a labor force more highly skilled than ever.

Educators began to recognize the pressing need to improve student performance. Doing well at school and college had never been more important for young people. High levels of educational attainment translated into improved life and career opportunities. The higher the level of education attained, the more choices an individual had and the lower the probability of ending up in a dead-end job or joining the ranks of the under-employed or unemployed.

At a collective level, society traditionally relied heavily on high levels of education. Values such as equality, fraternity, and democracy were hard to sustain without highly educated citizens. Moreover, high levels of education were essential to economic prosperity, particularly through the formation of a flexible, dynamic, and highly skilled workforce. The demand for unskilled labor began to disappear in advanced economies that experienced the full impact of globalization and the technology revolution. The factors that once were critical in determining the wealth of nations--labor, capital, and resources--gave way to new factors--namely, the knowledge, attitudes, and skills of the workforce. No country desiring to ensure social cohesion and ongoing economic prosperity could afford to settle for anything less than a world-class educational system (Hill & Crevola, 1999).

Vocational and Technical Education and Economic Development

A fundamental concern of any country is that of sustaining economic growth and development--a concern with worldwide significance. Factors spearheading the worldwide drive for sustained economic growth are (a) globalization, (b) technology advancement, and (c) the belief by many national governments and international developmental agencies that poverty can be reduced or eliminated. These agencies include the World Bank, United Nation Development Project (UNDP), United States Agency for International Development (USAID), and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

The role of VTE in the economic development of both industrialized and developing countries has been increasingly recognized (Qureshi 1996). Ever since the Industrial Revolution in the 18th century, economic development has been closely identified with industrialization. Structuring the VTE system to respond to economic and social changes has existed for more than two hundred years. However, the most recent developments have focused on preparing an educated, skilled, and motivated work force.

Economists Murnane and Levy (1996) stated that “during the past 20 years, the skills required to succeed in the economy have changed radically, but the skills taught in most schools have changed very little” (p. 3). However, the proliferation of advanced technologies and the phenomenon of globalization have altered the pattern of demand for manpower in both industrialized and developed countries (Kincheloe, 1999; Smith, 1995). This concern is a consequence of (a) continuous technological development and (b) the resultant upward shift in job skills requirements. As the proportion of high-skill jobs grow and low-skill jobs decline, skill requirements shift upwards even when no changes occur in the job content. Thus, students isolated from the real world in low-level academic courses and narrow-based vocational offerings find it difficult to transition from high school to meaningful and rewarding employment. This led Haddad (1999) to conclude that “without the skills to participate in a literate, technological world and the knowledge to transform their environment, people will remain on the margins of society, and society itself will lose their potential contribution” (p. 12) for economic development.

As a consequence of technological changes, additional and more complex skills and knowledge were required to perform successfully in the workplace. Knowledge and skills previously obtained by a portion of students, especially in developing countries, were becoming minimal requirements for all students, and the learning goals for superior students became more complex and sophisticated than ever before. Thus Golberger and Kazas (1996) concluded that the economic well being of a country depended increasingly on its human resources. They also concluded that workers would, therefore, needed skills and knowledge that enabled them to adapt to changing technology and associated job skills.

Murnane and Levy (1996) argued that a new kind of basic skills was required to compete in the global arena. These new basic skills included both hard and soft skills. Hard skills consisted of “basic mathematics, problem-solving and reading abilities at levels much higher than many high school graduates now attain” (p. xvii). Soft skills included “the ability to work in groups and to make effective oral presentation” as well as “the ability to use personal computers to carry out simple tasks like word processing” (p. xvii).

Thus skills and competencies necessary to meet the challenges of VTE were not obtainable through the traditional forms of VTE curricula and delivery systems. According to Basu (1999) a multi-dimensional approach was necessary for VTE to meet its objectives. Basu recommended an approach for VTE that included: (a) more broad-based and flexible curriculum replacing skill-specific training programs; (b) integration of training and education in cooperation with business, industries, education, and private sectors; (c) life-long and flexible learning to enable the professionals to meet the higher and varied demands of the job; (d) knowledge of new technologies (including the computer) and skills in using them for training and education; (e) development of multi-lingual and other communication skills; (f) increased emphasis on development of work ethics, teamwork, human values and other non-technical competencies like leadership, time management, environmental awareness; and (g) development of self-employment and entrepreneurial skills.

Kelly (1991) further suggested that configuration of a country's skill systems--vocational and technical education (VTE)--should (a) be diverse and mixed, (b) combine both public- and private-sector elements, and (c) involve cost sharing, on-the-job and institutional training, apprenticeships, work-release, and related components. According to Haddad (1997) the most important educational problem of developing countries revolved around improving the quality of education, particularly making it relevant for high-technology development. Educators needed to (a) facilitate the introduction of new kinds of scientific, mathematical, information technology and technology management programs into their curricula; and (b) forge new links between universities and business (industrial and agricultural). However, the restructuring of many countries' economies also influenced this change in patterns of demand for human resources. Developed countries, in particular, were experiencing a shift in demand for traditional goods and services, which likely resulted in restructuring large sectors of their respective economies (Smyth & Shacklock, 1998).

Within the context of globalization, developing countries became price takers. "They are influenced by, rather than influencing, output, price, and terms of trade. They do not set trends; they react to them" (Kelly, 1991, p. 29). Hence, labor markets and associated skill-development systems--VTE programs--in developing countries needed to be flexible and adaptable to rapidly changing external conditions. Rapid change made accurate long-term prediction of skills-demands and skills-longevity difficult, thereby necessitating a highly mobile and flexible workforce--one more quickly adaptable to new skills (Haddad, 1997; Kincheloe, 1999; Psacharopoulos, 1997; Smith, 1995).

As many national governments began searching for strategies to stimulate further economic development and global competitiveness, they increasingly turned to their educational systems, in particular VTE for help. The strategists often asked VTE to help society meet a number of economic challenges, such as the perceived need (a) for a workforce with varied skills, and (b) for equalizing the distribution of talent and wages across a population. During the 1990s, policymakers in the United States became increasingly attentive to the relationship between VTE and economic health, attempting to ascertain how best to ensure the United States's premier economic position relative to other nations (Stasz, Chiesa, & Schwabe, 1998).

Having historically acknowledged a skilled workforce as the engine for economic growth, VTE traditionally led in responding to workplace needs. More recently, Lopez, Thomas and Wang (1998) established the relationship between a country's level of income and their citizens' level of education. They concluded that workers in countries with a high per worker output had obtained higher educational levels than workers in low-productivity countries. The authors further argued that, ". . . no country has achieved sustained economic development without substantial investment in human capital (vocational and technical education)" (Lopez, Thomas, & Wang 1998, p. xx). Their conclusion dovetailed with earlier studies demonstrating exceptionally high returns on various forms of educational investment: basic education, research, training, learning-by-doing, and capacity-building--all necessitating investment in human capital.

Vocational and technical education (VTE) provided numerous skills that were specific to chosen occupations. It also facilitated worker-adaptability to workplace changes by equipping workers to (a) participate in management decisions, (b) communicate with one another in flexible work teams, and (c) understand the need and motivation to retain for economic independence (Vaughan, 1991). He continued,

Occupational education (*VTE*) is not a special program for special groups. It deserves serious attention as a way to meet all the new demands for employee skills as a way to enhance the increasingly scarce supply of skilled labor (p. 447).

In addition, research indicated that VTE programs lowered dropout rates, raised incomes of disadvantaged youth, and provided unskilled people with productive skills they would not otherwise have obtained (Bailey, 1990).

Federico Major, Director-General of UNESCO expressed similar agreement. At the Second International Congress on Technical and Vocational Education, in April, 1999 at Seoul, Korea, Major strongly urged the government of Member States, inter-governmental and non-governmental organizations, and developing agencies to join UNESCO's effort to renew commitment to VTE. Describing the effort as "a matter of urgency," he continued,

. . . the principal objective of the Congress was to convince governments, donor agencies, industries, and all stakeholders of the importance of VTE for economic development. Education is the most powerful means to improve the quality of life, the single most powerful weapon against poverty and intolerance. Government needs to be more aware of the social and economic relevance of skills and should provide vocational and technical education with a commensurate share of social investment (n.p.).

Policymakers and business leaders were beginning to link VTE with economic development as they emphasized how investments in VTE led to increased incomes, more jobs, reduced dependence on government social programs, and other visible outcomes (Murnane & Levey, 1996). VTE became central to a nation's human capital investment--an integral part of a system that could meet all types of employment needs and overcome labor-supply barriers. The economic agreement in favor of vocational and technical education was linked to the perceived need to orient the formal education system to the needs of the workplace (Middleton, et al., 1993). It was based on the

assumption that economic growth and development were technology-driven and human capital-dependent. Traditional academic education was an inadequate alternative to train sufficient numbers of workers to meet current and future demands for skilled labor. Moreover, some claimed that academically oriented schools showed preference for white-collar careers over blue-collar occupations, thereby instilling negative attitudes towards scarce, blue-collar jobs. Such a claim further aggravated the shortage of skilled laborers (Middleton, et al., 1993; Smith, 1995).

To ascertain how to make VTE and employment training more effective and efficient, Middleton (1991) examined policy strategies designed for just that purpose. Drawing from World Bank studies, he suggested six viable strategies for developing countries to use in shaping vocational education and employment training to achieve the dual purpose of greater efficiency and effectiveness. These suggestions are as follows:

The first strategies to improve the effectiveness of vocational education and training should be based on the economic circumstances and level of institutional development of each country. Second, strengthening basic and academic or general secondary education has high priority in building the basic skills needed for productivity and the more advanced conceptual skills needed to make retraining to meet changing occupational requirements effective. Third, training by private employers and in the proprietary training sector can be encouraged and improved because it reduces the burden on public budgets. Fourth, if the responsiveness of public training to market forces can be improved, it will raise both effectiveness in placing graduates in jobs and efficiency in the use of training resources. Fifth, sources of financing must be diversified to increase the contribution of the principal beneficiaries of training-- employers and workers. Sixth, improving the impact of training on the income of the poor requires broad strategies in which training plays a complementary role (Middleton, 1991, p. 8).

Middleton further argued that VTE and employment training must be responsive to market forces if it intended to play a constructive role in a country's economic development. Thus, national policy strategies needed to encourage links between VTE programs and market forces and address the balance between private and public vocational education. As such, effective strategies to improve the quality of VTE were those that incorporated the social and political context of the country in which vocational and technical education and employment training were to be implemented.

The importance of VTE in the educational structure of developing countries continued to be a matter of debate (Abrokwa, 1995). School-based VTE programs, which were previously effective in developing countries, became the object more recently of criticism and scrutiny. Several authors (for example see, Adams, Middleton, & Ziderman, 1992; Foster, 1992; Gray, 1993; Psacharopoulos, 1988; Salmi, 1991; Watson, 1994) questioned the effectiveness and efficiency of VTE in developing countries. Two main criticisms were leveled against these programs: first, VTE graduates could not find jobs in the occupational areas in which they were educated; and second, governments of developing countries could not afford VTE with the average unit cost nearly twice the cost of general secondary education. The literature further supported the view that

vocational and technical educational programs tended to be successful when they were operated by a system dedicated to VTE--wherein VTE operated as specialized schools in a regular system that linked to the economic development of a country.

A number of experts further argued that the poor economic status of developing countries contributed to the low employment rate of students who completed VTE programs (Adams et al.,1992; Foster,1992; and Middleton,1991). Economic conditions fostered by globalization and technological advancements were beyond the control of educational institutions. Nevertheless, if VTE programs forged congruent links with national economic development strategies, they could play a significant role in improving their respective national economies. Thus the real challenge for a developing country like Trinidad and Tobago was to reform its VTE system and link it with the country's current and future economic developmental needs and trends.

However, two conflicting arguments surfaced regarding the cause of high unemployment in developed countries. The writings of US economist Lester Thurow represented one argument. He argued that high unemployment resulted from the ability of multinational firms to locate in countries with low wage scales. The relatively high wage scales in developed countries motivated many to secure labor from the international labor market. In their search for low-paid workers, multinationals shied away from opening new manufacturing plants in developed countries (Thurow, 1996).

Economist Paul Krugman (1997) provided a different explanation for high unemployment rates. Krugman argued that technology developments were causing unemployment. New technology, he asserted, displaced unskilled workers and workers whose skills were tied to obsolete forms of technology. In addition, the well educated were favored because they could more readily adapt to technological changes. For Krugman, the key to solving the problem of unemployment, particularly unemployment among youth, was education for technological change.

In most countries, the effectiveness of VTE was measured on the basis of the ability and willingness of graduates to obtain and hold a job, and move horizontally or vertically on the occupational ladder (Findlay, 1993; Gray, 1993; Grub, 1997). Using this measure, the Trinidad and Tobago VTE programs in the past were not effective. Since VTE programs were not linked with labor market demands, there were few jobs available for graduates during the economic depression years from 1983 to 1993. However, when the economy showed positive growth, after 1993, graduates from VTE programs did not possess the necessary skills or knowledge for the jobs in the growing sectors, especially in energy. Most importantly, education aspirations of students and expectations of their parents and employers did not match the objectives of VTE. In short, vocationalization of school curricula to produce basic-level skilled workers, employable in the local labor market, was by-and-large a failure.

Q-Methodology

Q-methodology is a method for the scientific study of human subjectivity whereby subjects communicate their points of view (Stephenson, 1953). It combines sound, historically successful qualitative and quantitative procedures to elicit opinions from groups of people, often for assessing needs or setting objectives. While Q-methodology

originated from factor-analysis work during the 1930s, it did not emerge as a research method until 1953 when William Stephenson published *The Study of Behavior: Q-Technique and Its Methodology*. This pioneering work presented a conceptual and empirical body of knowledge claiming that Q-methodology was “. . . a comprehensive approach to the study of behavior where man is at issue as a total thinking and behaving being” (Stephenson 1953, p. 7). Hence Q-methodology is characterized as a set of philosophical, psychological, statistical, and psychometric ideas oriented to research the individual.

Q-methodology does not ignore the human and cultural dimensions of societies--dimensions that comprise the very heart of research issues related to education and economic development. In education, Q-methodology reveals the political or educational philosophy that undergirds an education system. Q-methodology recognizes that an education system is context-specific; therefore, the underlying philosophy and assumptions in one context might, in another context, be substantially different. Accordingly, Raivola (1985) used cultural bias to exemplify the context-specific concept:

The essence of cultural bias is this: the way individuals represent the world to themselves and their concept of knowledge and truth are such an organic part of their culture-bound thinking that they cannot recognize a different world or a different truth (pp. 558-559).

By providing the tools for analyzing an education system within a total socio-economic and cultural context, Q-methodology helps to identify and provide an understanding of the issues affecting education. Using these tools, researchers analyze entire education systems--in whole or in part (e.g., VTE is a part of a larger education system). In doing so, they may highlight all the influences that impact the system, or just focus more closely on certain components, such as economic or employment needs. In addition, Q-methodology enables researchers to analyze the underlying educational philosophy in a given area, region, or country, and to explain the broader social and cultural philosophy embedded in the structural dynamics of the system or one of its subsystems.

Brooks (1970) noted the distinction between Q-sort technique and Q-methodology. According to Brooks,

. . . Q-methodology has been used to refer to Q correlation, responses by card sorting, a specialized use of questionnaire items, forced responses so that data falls into a preestablished distribution, and factor analysis of Q correlation. Q-sort technique has constantly referred to a specific method of eliciting responses, namely sorting cards. It is a sophisticated form of ordering statements, adjectives, or objects by rank. (p. 165)

Denzine (1998), in agreement with Brooks, stated

. . . Q-methodology refers the use of Q-sorting, which is a data collection technique, and Q-factor analysis, which is a procedure for statistical analysis. While Q-sorting and Q-factor analysis can be used independently, they can also be combined, which allows the researcher to benefit from both qualitative and quantitative research approaches.

While Q-methodology is regarded as a general approach to the study of individuals and consists of a variety of techniques, Q-sort lies at the heart of the method. However, while

both Q-sort and Delphi techniques are qualitative methodologies that have been used successfully to obtain the opinions of groups, Q-sort does not strive for consensus or make use of a series of mailing (Worthen, Sanders, & Fitzpatrick, 1997).

Q-sort consists of a number of stimuli which participants are required to sort into categories along a continuous dimension. The purpose of the sorting is to get a picture of the individual's own view of, or attitude towards, the object being considered. In Q-sort, the stimuli can be a collection of verbal statements, single words, phrases, objects, pictures, or related item-types. The task of each participant is to rank-order the stimuli along a continuous dimension such as *most important to least important*, *prefer most*, to *prefer least*, or *most like me to least like me*. While the number of stimuli (statements, objects, etc.) in a Q-sort is determined by convenience and statistical demands, for statistical stability and reliability, Kerlinger (1986) suggested "a good range is from 60 to 90 cards" (p.509). In addition, Wolf (1988) suggested a distribution of 7 to 12 categories between the extremes of the continuous dimension.

Q-sort employs two types of stimuli collection based on the selection of variables for use in Q-studies (Kerlinger, 1986; Thompson & Demmings, 1993). Users of Q-sort distinguish between unstructured and structured Q-sort. Unstructured Q-sort utilizes random selection of stimuli and variate designs. It represents a singular proposition without regards to the factors involved in the theory. The only criterion for selection of the stimuli in unstructured Q-sort is that it applies to one broad variable being tested (Brooks, 1970). Thus, "the testing can be pursued without regards to the structure of the sample, namely by way of factor analysis" (Stephenson, 1953, p.75).

Structured Q-sort is achieved by applying Fisher's methods of experimental design to the sample. The stimuli used in a structured Q-sort are selected to correspond to a particular theory or set of hypotheses. This method of building Q-sort is especially valuable in the testing of theory. Since the instrument is constructed to embody a theory, sorting items by "known types of individuals" can test the hypothesis generated by the theory. The use of structured Q-sorting to build and test theory is an important suggestion of Stephenson (1953, 1967). However, most Q-methodology studies are undertaken without a structured sample (Stephenson, 1953; Wittenborn, 1961; Kerlinger, 1986).

In addition to the two methods of data collection--structured and unstructured, there are three response formats in Q-sort--"forced choice" quasi-normal, mediated, and unnumbered graphic scale. The "forced choice" quasi-normal Q-sort is the most common response format used by researchers in Q-studies. This response format requires all participants to rank-order a predetermined number of stimuli for each category along the continuous dimension. The number of stimuli to be placed into each category is selected by the researcher to produce a quasi-normal symmetrical distribution of scores. This response format yields ipsative data (Cattell, 1944). A response to one stimulus inherently constrains the possible choices for subsequent items.

The second response format, the mediated Q-sort, allows participants to provide more data regarding variables without being cognitively overwhelmed (Thompson, 1998; Nunnally, 1978). This is achieved by allowing participants to first separate the stimuli into categories and then rank-order the stimuli within each category by level of importance or agreement. Thus, the number of categories and the number of stimuli within each category may vary from participant to participant.

The third response format, the unnumbered graphic scale Q-sort, is based on normative measurement (Cattell, 1944). This format results in greater variance in the data since the rating of one stimulus is not tied to the rating of any other item (Thompson, 1981). In this response format, participants are presented with a straight line drawn between two antonyms (e.g., “Agree” and “Disagree”) and are required to mark through the given line at the position that best indicates the extent of the participants’ agreement with the given stimuli. The researcher using an equal-interval scale then scores these marks. However, since this format is based on normative data the bivariate product-moment correlations are attenuated by heteroscedastic distribution.

Q-sort data have generally been analyzed in terms of their correlations or similarities. The correlation between the participants can be inspected to determine (a) whether clusters of participants appear to define particular types; or (b) how many different types (factors) of participants there are. According to Jones, Parke, and Pulos (1992) Q-sort is most appropriate for investigating patterns, process, and change in case study, experimental, quasi-experimental, longitudinal, and cross-sectional research studies.

The second technique applied in Q-methodology is factor analysis. Factor analysis is fundamental to Q-methodology since it serves as the statistical means by which participants are grouped through the process of Q-sorting. Fundamentally, Q-factor analysis examines the correlation matrix among people computed against variables. According to Stephenson (1935), the goal of Q-factor analysis is to identify factors that are composite of individuals who significantly load on one factor and no other factor(s). However, factor analysis embodies a variety of analytic techniques aimed at examining or summarizing the relationships among variables or other factorable entities (Carr, 1989, 1992; Grosuch, 1983). To this end, Kerlinger (1986) stated,

. . . Factor analysis serves the cause of scientific parsimony. It reduces the multiplicity of tests and measures to greater simplicity. It tells us, in effect, what tests or measures belong together . . . It thus reduces the number of variables with which the scientist must cope. (p. 569)

Similarly, Tinsley and Tinsley (1987) further elaborated as follows:

. . . Factor analysis is an analytic technique that permits the reduction of a large number of interrelated variables to a smaller number of latent or hidden dimensions. The goal of factor analysis is to achieve parsimony by using the smallest number of explanatory concepts to explain the maximum amount of common variance in correlation matrix (p. 414).

As such, factor analysis has made its most direct contribution to education through its influence on the composition of test batteries for educational or vocational guidance. Factor analysis has served to identify skills, abilities, and areas of achievement that are relatively independent, and has thus avoided the unnecessary duplication of measurement in providing a profile of a student’s performance.

In applications in education, factor analytic studies have been undertaken in such diverse areas as prose style, administration behavior, occupational classification, attitudes and belief systems, and the economies of education. However, the major impact of factor analysis is in exploratory studies where it has the great value of defining factors for use in further research (Spearritt, 1988)

According to Cattell (1978), Gorsuch (1983), McKeown and Thomas (1988), and Thompson (1998), all of the factor-analysis theory developed for R-factor analysis applies to Q-factor analysis. However, there are two distinctions between R and Q-techniques. In the first, it is the organization of the raw data matrix that distinguishes both techniques, and not the mathematics of the factor analytic process. In R-factor analysis, the rows represent scores of people and the columns represent the different variables being measured; whereas, in Q-factor analysis the rows represent the different variables being measured and the columns represent participants' Q-sort correlations. Thus, Q-factor analysis refers to modes-of-analysis in research, whereby people and variables are subject to detailed factor and variance analysis.

In contrast to R-methodology, Q-methodological analysis can only be employed when the number of participants being factored is small relative to the number of variables in the study (McKeown & Thomas, 1988; Stephenson, 1953; Thompson & Miller, 1983; Thompson, 1998). Thompson (1998) further elucidating this distinction stated this:

. . . we generally want the number of rows replicates to be several times larger than the number of the column entities that we are factoring. . . . in Q-technique we want several times more variables than factored people. This is to allow the patterns of relationships among the factored entities to be replicated over quite a number of rows in the raw data matrix, so that we can be sure that the estimated relationships are stable, and therefore that the factors we extract from the matrix of associations will themselves also be stable (p. 6).

Therefore, the number of participants needed for a Q-analysis is a function of the number of stimuli in the study. Specifically, the maximum possible number of participants in a Q-sort can be determined by the following formula: $[(\# \text{ of items to be sorted})/2] - 1$ (Thompson, 1981; Thompson & Miller, 1983). Thus, for a 60 statement Q-sort the maximum number of participants feasible for the study is 29.

According to Kim and Mueller (1978) the factor analysis procedure involves four major steps: (a) data collection and preparation of the covariant matrix, (b) extraction of the initial factors, (c) rotation to a terminal solution, and (d) interpretation and construction of factor scales for use in further analyses. In Q-methodology the first step--data collection and preparation of the covariant matrix--is achieved through Q-sort. The remaining steps are achieved through the application of Q-factor analysis statistical package. In Q-methodology the factor scores are used in the interpretation of the factors (McKeowen & Thomas, 1988), inasmuch as one factor score is calculated for each variable on each person factor. The factor scores provide information as to which items identify and differentiate the factor cluster of people.

The range of applications in Q-methodology is enormous, spanning hundreds of different problems across the spectrum of the social and behavioral sciences. Moreover, "over 2,000 Q-studies since 1937 have shown the method to be robust and reliable" (Peritorie & Peritorie 1990, p. 402), and there is hardly a corner of human endeavor to which it has not been applied (Brown, 1986). The popularity of Q-methodology is also demonstrated by the fact that this researcher found 267 Q-methodology articles in educational journals dated from 1966 to June, 2000 (results from an ERIC search). Q-

methodology is particularly useful in (a) developing theory, (b) investigating differences between persons (participants), (c) testing effects of independent variables on complex dependent variables, and (d) undertaking exploratory research (Daniel, 1993; Kerlinger, 1986; Wolf, 1988).

Strengths of Q-Methodology

Like any research methodology, Q-methodology is subjected to both strengths and limitations. The strengths of Q-methodology are as follows:

1. The main strength of Q is its affinity to theory. Thus if a theory, or aspects of it can be expressed into categories and if the statements of items that express the categories can be produced, then Q-methodology can be a powerful tool for testing theory. This process is dependent upon the use of factor analysis of the Q profile to discover a respondent's factors (Kerlinger, 1986; Nunnally, 1970, Wolf, 1988).

2. Q-methodology is suitable for intensive study of the individual. The same person can sort a Q-sort many times under different conditions of instruction. The data as a result of the sorting can be analyzed objectively without sacrificing the richness of the usual clinical and case study method (Kerlinger, 1986; Stephenson, 1953; Wolf, 1988)

3. Q-methodology can be used to test the effects of independent variables on complex dependent variables. Through use of structured Q-sort one can sensitively assess the effects of variables by using analysis of variance procedures (Kerlinger, 1986; Wolf, 1988)

4. Q-methodology is useful in exploratory research as well as for its heuristic quality. The use of Q in conducting intensive study of a single case or a few individuals is helpful in turning up new ideas, formulating hypotheses and examining relationships when used to explore hunches (Kerlinger, 1986; Wolf, 1988).

5. Q-methodology aids in the construction of factor arrays, which when properly constructed are *new* Q-sorts that reflect the factors from which they were calculated. Factor arrays aid in the interpretation of a respondent's factors and can assist in scale construction. High factor arrays make good scale items. (Kerlinger, 1986).

6. Another use of factor arrays is as prototypes of factors that can be administered to individuals to assess their attitudinal agreement with the factors (Kerlinger, 1986)

Limitations of Q-Methodology

The limitations of Q-methodology are associated mostly with its statistical procedures rather than methodological issues. The following are Q-methodology limitations:

1. Q-methodology is not suitable for large or cross-sectional samples (Kerlinger, 1986).

2. In Q-methodology, the researcher does not draw a random sample of possible participants so it is difficult to generalize to the entire population (Kerlinger, 1986).

3. Q-methodology that uses an ipsative force-choice method is constrained by the placement or ranking of the statements or items. This violates the independent assumption that underpins statistical analysis. However, Fisher's advice given long ago was to raise the level of statistical significance from the usual 0.05 level to the 0.01 level of significance (Kerlinger, 1986; Wolf, 1988).

4. Another criticism of the force-choice method is that it is unnatural, as it requires the respondents to conform to an unreasonable requirement (McKeown & Thomas, 1988; Kerlinger, 1986).

Summary

The literature review began with a background review of globalization, economic development, and the changing needs of the workplace. Especially notable was the impact of each of these on education, labor markets, and production (Croft & Beresford, 1992), and the resultant shift of emphasis in economic development factors. This shift in focus moved from one that emphasized labor, capital, and resources, to one that emphasized workers' knowledge, attitudes, and skills (Hill & Craven, 1999)--a shift caused by responding to the demand for flexible, dynamic, and highly skilled workers (Nicholls, 1998). Globalization spearheaded the restructured workplace organization--one characterized by greater reliance on technology for resolving complex and intractable social moral and political problems (Smyth & Shacklock, 1998). Thus by compelling a change in economic factor emphases, globalization thereby spurred a change in the requirements for VTE programs.

In the second section, the researcher extracted from the literature, findings that detailed how the phenomenon of globalization, with its concomitant transformation of economies, changed the requirements for VTE. (Basu, 1998; Kelly, 1991; Murnane & Levy, 1996). As national governments turned to VTE to stimulate further economic development they needed to improve program quality; make decisions regarding the curricula; link programs to national economic development strategies, and develop articulated agreements between educational institutions and business and industry (Haddad, 1997; Kincheloe, 1999; Lopez, Thomas & Wang, 1998; Psacharopoulos, 1997; Smith, 1995; Stasz, Chiesa, & Schwabe, 1998; Vaughan, 1991).

In the third section, the researcher examined the history and use of Q-methodology, and concurred with numerous research experts that this methodology presented an ideal research approach for the examination of the links between VTE and economic development, as numerous factors affect the way a country's economy and education system are organized. Accordingly, seasoned researchers concluded that Q-methodology was ideal for opening up new areas of research (Kerlinger, 1986; Nunnally, 1970; Stephenson, 1953; Wolf, 1988). This research methodology took into account the human and cultural dimensions of society and sought to explain the broader social and cultural philosophy undergirding the structural dynamics within which each system (for example economic development or education) or subsystem such as VTE operated. It provided the tools for analyzing the entire system or a part of the system. Such an analysis, undertaken within a total socio-economic and cultural context, either highlighted all the influences that impinged upon the system, or isolated only certain features. Chapter 4 continues to explore this methodology and its use in this investigation.

Chapter IV

METHODOLOGY

The objectives of this chapter are two-fold: (a) to explain the context in which the methodology is used and the rationale for its selection in this study; and (b) to describe the research design, including the sampling plan, instruments, and research analysis methods used.

Research Design

The most relevant of the presuppositions that determine one's research design perspective is that methodological issues must always be answered within the context of the nature of the problem in a particular research setting. When selecting the appropriate research methodology for this study, the investigator considered both quantitative and qualitative research methodologies. An examination and assessment of each disclosed that quantitative methodology is primarily designed to compare research results within an existing body of knowledge, whereas qualitative methodology can be used for exploratory research or to establish a pilot function for a theory (Denzin, 1980; Maeton, 1967; Patton, 1980). In this investigation, the selected research methodology had additional criteria: namely, the ability to (a) assess the value or quality of an educational (vocational and technical) program; (b) identify what needs to be changed or improved; and (c) effectively use a small sample size. The nature of the research problem and questions posed in this study pointed to the use both quantitative and qualitative methodologies. For reasons discussed in Chapter III, Q-methodological research methods that combine Q-sort and Q-factor analysis were chosen for use in this study.

Research Design

The Q-methodological design chosen for this study utilized unstructured sampling with forced-choice, quasi-normal distribution (as described in chapter III). Several factors led to the selection of this method. Unstructured sampling and forced choice, quasi-normal distribution use a variate design, preventing participants from ranking all statements at either extremes of a continuum--for example *most important to least important*, *most like me to least like me*, or *prefer most to prefer least*. The forced-choice, quasi-normal distribution also requires participants to distribute their responses in terms of a predetermined fixed distribution, usually approximately normal. Such a methodological protocol yields raw data results in which all respondents have exactly the same mean rating, the same standard deviation of ratings, and the same distribution of ratings--the same skewness and kurtosis. Thus, relationships of respondents' score-profiles cannot be attenuated by score distribution differences, because the distribution is identical for each respondent.

A data collection method that requires forced-choice ranking honors a reality in which programs cannot pursue all possible ends with all possible means. As such, forced-choice ranking has been used whenever a limited number of ends or means can be realistically pursued. The Q-technique methods selected for this study are well suited to studying educational change and implementation models in which numerous ideals

present themselves, but in reality only a limited number of ends or means can be realistically pursued.

Sampling Plan

In Q-methodology, the concept of sampling is twofold. First, for the purpose of this study, it involves the sampling of persons (P-set). Second, sampling principles and procedures are central to the design and composition of the Q-sample (collection of stimulus items presented to participants for rank ordering).

P-set

In Q-sort, P-set refers to the sample of persons expected to have viewpoints pertinent to the problem under investigation. The sampling of people in Q-sort has generally not received as much attention as Q-sample. McKeown and Thomas (1988, p. 36) stated “the specific sampling principles and techniques important to mainstream behavioral research are not necessarily relevant to person sampling in Q given the contrasting research orientation and purpose.” However, the use of P-set ensures a reasonably comprehensive and representative selection of a particular population of stimulus elements. Brown (1980, p. 260) stated “the selection of subjects is likely a theoretical matter, and the goal is again representiveness, but not in a random-sampling sense: as in the sampling of statements, breadth and diversity are more important than proportionality.” Kerlinger (1986) further explained, in Q-methodology the researcher selects “a small set of individuals carefully chosen for their “known” or presumed possession of some significant characteristic or characteristics” (p. 512). Thus, participants selected to participate in Q-methodology must be carefully selected. Further, using a factorial designed P-set allows the researcher to sample different populations of theoretical interest and provides a degree of comprehensiveness not found in other sampling methods. For these reasons, a factorial designed P-set sampling method was employed in this research.

In an effort to increase validity and reliability of the study, the researcher selected groups of experts from a cross-section of the country to be included in the P-set. These selected groups of experts consisted of educators from international development organizations and locally, business, economists, labor leaders, manufacturing, and service industries who are involved in defining both the needs for VTE in economic development and workplace skills training. Experts selected demonstrated knowledge in the areas identified above through their scholarship, or direct experience in VTE or economic development in Trinidad and Tobago

By using the World Wide Web, the researcher identified four international organizations involved with education issues in Trinidad and Tobago. These organizations were representative of those that formulate, direct, and evaluate educational programs in developing countries. Individuals identified in these organizations were required to meet three of the following four criteria in order to qualify as experts: (a) possess knowledge of VTE or economic development in Trinidad and Tobago by having occupied an administrative position, (b) be identified by colleagues and other reputable leaders as being the most qualified in the organization to assist the research

(c) be a professional with an acclaimed published work in the field of VTE or economic development, and (d) be currently working (the year 2001) in Trinidad and Tobago.

Individuals identified in the other areas were required to meet two of the following three criteria to be considered an expert. The candidates for selection must have (a) accrued at least three years of work experience in the field of VTE economic developmental activities, including labor representation; (b) served in a position of educational leadership, and (c) earned acclaim by colleagues and other reputable leaders as the most qualified in the organization to assist in the research.

From the 7 groups of experts, a total of 29 professionals emerged as candidates for participation in the investigation. The researcher then asked them to participate in the Q-sort. The composition of the 29 participants consisted of 4 participants from each of the following areas: (a) international development, (b) business, (c) economists, (d) labor, (e) manufacturing, and (f) service industries. Additionally 5 of the participant-candidates from the local education leadership personnel area were asked to take part in the study. Of the 29 experts identified, 8 responded to the concourse questionnaire and 15 to the Q-sort. However, three of the Q-sort responses were incomplete and were rejected.

The *number of participants* in a Q-sort is a function of the number of stimuli used; whereas *number of stimuli* is governed by convenience and statistical demand. However, for statistical stability and reliability Kerlinger (1986) recommended the number of stimuli should be no less than 60. According to Thompson (1981) and Thompson and Miller (1983), the maximum number of participants feasible for a 60 stimuli Q-sort would be 29.

Q-sample

The investigator developed the Q-sample used in this research by utilizing the written narrative naturalistic Q-sampling technique. Written narrative naturalistic Q-sampling mirrors the opinions of the respondents performing the Q-sort, and aids in expediting both the Q-sorting process and attributions of meaning since the items in the Q-sample are based on the respondents' own communications (McKeown & Thomas, 1988). Prior users of this Q-sampling method include (a) Brown (1977a)--examining students' responses to political literature; (b) McKeown & Graig (1978)--evaluating American college students' educational experiences at foreign universities; (c) Martin and Taylor (1987); Thomas, Martin, Taylor, and Bass (1984)--undertaking studies of political obligation; and (d) Stephenson (1978)--assessing audience responses to movies.

To facilitate this study, a group of selected individuals (see the P-set subsection for selection criteria) were asked to list five to eight statements about what suggested changes to vocational and technical education (VTE) in Trinidad and Tobago would have the most potential to improve economic development during the next three to five years. The propose of this question was twofold: (a) to facilitate the development of a concourse for use in the Q-sort and (b) to produce a set of statements that were as comprehensive as possible so as to mirror the range of commentary being voiced in the public at large. For this reason, the investigator surmised that any prelist would constrain the range of statements and would not authentically reflect (a) current changing dynamics and status of VTE or (b) current and future economic expectations.

Instruments

This investigation involved the use of two research instruments. The first instrument; a questionnaire, served as a tool for gathering information and formulating the statements used in this study. The second instrument, Q-sort, required participants to rank-order the statements on a numeric continuum from *most important* to *least important*.

Concourse Questionnaire

In Q-methodology the flow of communicability surrounding any topic is called a concourse; it is from this communication that the statements or items are subsequently drawn for administration in a Q-sort. This study precluded any prelist of statements so it would be a more realistic representation of the dynamic role VTE is playing (or is about to be played) in the economic development of Trinidad and Tobago. VTE's contribution to a country's economic development is unique and specific for that particular country and should be designed to fit within the nations' distinctive economic environment (Herschbach 1998; Middleton & Zideman, 1997). Some scholars (Herschbach 1998; Herschbach, Hays, & Evans, 1991; Psacharopoulos, 1991) have cited the lack of understanding of this concept as a leading cause for failure of many VTE programs in developing countries. The questionnaire required participants to list five to eight statements enumerating projected changes in VTE that offered strong potential--according to their experiences and perceptions--for strengthening Trinidad and Tobago's economy in the next three to five years. The respondent-statement questionnaire is presented in *Appendix C*.

Q-Sort Instrument

The Q-sort instrument evolved in several phases. In the first phase, an independent editor with several years of experience, a Ph.D. in vocational and technical education and a Masters degree in English (a) edited all statements received from the concourse probe questionnaire and scrutinized the contents carefully; and (b) reorganized the information content of the fragments and reconstructed from them a single statement reflecting the context of the statements received (see *Appendix D*). In the second phase, the researcher formed an independent three-judge panel (comprised of three doctoral students who had several years of work experience in the education profession) and presented each panel member with the original respondent statements. After reading the original respondent statements the judges decided which of the edited statements best reflected the respondents' views. The process required the judges to (a) place the cards containing the reconstructed statements in an ascending numerical order that corresponded to the original respondent-statements; and (b) note cases where two or more respondents' original and reconstructed statements were found to express similar or parallel concepts, thereby enabling one to be retained for use in the final Q-sort. In the third phase, the investigator used a random number table to assign random numbers to the statements for use in the Q-sort. The fourth phase involved creating a database for administering the Q-sort, linking it to the World Wide Web (See *Appendix E* for the design and protocol used in the development of the database). Instructions directed the participants to log on to the website and select, identify, and first, rank-order the 25 most

important statements. Instructions further directed the participants to repeat the process for the 25 least important statements. Participants rank-ordered their selected statements on a continuum from *most important* to *least important*, utilizing 11 different categories that reflect the profile of a quasi-normal distribution. *Appendix G* presents the randomly numbered statements used in the Q-sort.

Research Analysis Method

Q-factor analysis (a computer-based program--PQMethod) was utilized to analyze the data. First, respondents' rank-ordered statements were analyzed statistically using Q-factor analysis to develop a Q-sort correlation matrix, to which factor analysis was then applied. Resulting factors from the initial factor analysis were chosen on the basis of decreasing amounts of explained variance. Then clusters of variables that were highly intercorrelated were delineated statistically with the clusters brought about by factor rotation. The purpose of the rotation was to isolate those groups on inter-correlated variables. The factor rotation used in this study was varimax rotation. The varimax rotation technique is used to maximize variance across all factors in the matrix and to extract those factors that are independent of each other rather than those that are correlated as in the oblique rotation (Kerlinger, 1964). In exploratory studies, such as this, varimax rotation allows the researcher to simplify a factor rather than a particular variable because the interest invariably lies in learning more about the factors rather than about the variables.

PQMethod (release 2.09) is a freeware program (available at <http://www.rz.unibw-muenchen.de/~p41bskm/qmethod>) that was adapted from the mainframe-program Qmethod, developed by John Atkinson and revised and maintained by Peter Schmolck. This "statistical program is tailored to the requirements of Q studies." Specifically, "it allows the researcher to enter participants' Q-sort data the way they were collected, as piles of statements numbers" (Schmolck, 2000, n.p.). The program allows the researcher to compute correlations among Q-sorts, which can then be factor-analyzed with either the centroid or principal component method. Resulting factors can be rotated either analytically by using the varimax function, or judgmentally with the help of two-dimensional plots. After selecting the relevant factors and flagging entries that define the factors, the analysis step produces an extensive report with a variety of tables on factor loadings, statement factor scores, and discriminating statements for each of the factors, as well as consensus statements across factors (Schmolck, 2000).

However, the numbers of respondents (sorts), statements, and resulting factors limit PQMethod. The maximum numbers allowable in these categories are 299, 200 and 8 respectively. The program is further limited to a maximum of 13 degrees on the continuum with a total of 50 respondents within each degree (Schmolck, 2000).

Summary

This chapter described the investigation's research design and methodology, including sampling plan, instruments, and research analysis method. Base on the subjective nature of this research, Q-methodology became the research method of choice. This methodology is mainly used to open up new areas of research utilizing small

samples of participants who are carefully chosen for their “known” or presumed possession of some significant characteristic(s).

A first step in this study was the design of a questionnaire for gathering information and configuring a concourse of statements. The purpose of the questionnaire was to collect opinions from the selected population (P-set)--opinions expressing views about VTE and its role in the economic development of Trinidad and Tobago. These expressed views were solicited for use in a Q-sort.

A forced-choice quasi-normal distribution was used in the sorting of the randomly numbered statements. This forced-choice sorting required each participant to judge and place a predetermined number of statements into each of the degrees of importance on a continuous scale from “most important” to “least important.” Participant individual correlation, factor array, and factor analysis was determined by Q-factor analysis. The next chapter further delineates the nature of the methodology and instruments used in this study as a prefacing backdrop to enumerating, and explicating the results and how they answered the research questions.

Chapter V

RESULTS

This investigation attempted to ascertain the nature and value of promising changes in vocational and technical education (VTE)--those most likely to strengthen and expand the economic development of Trinidad and Tobago in the next 3 to 5 years. First, the researcher surveyed a select group of experts, eliciting from them the VTE changes they believed would most contribute to economic development. Next, the experts rank-ordered the collective list of statements. The chapter begins with an overview of how the PQMethod applied to this study, then defines Q-methodology terms and describes the results obtained from the concourse and Q-sort questionnaire.

Overview

Accurately comprehending and interpreting the results of Q-factor analysis necessitates an understanding of the data entry process and the PQMethod as applied in this study. In order to perform the Q-factor analysis used in this study, the researcher had to complete several steps. The first step was entering the 60 Q-sort statements into the QSTATE file. PQMethod use this universe of statements to define the factors by clustering statements that are more similar to each other than they are with others. Step two was entering the data from the respondent Q-sort into the QENTER file. Last, selecting QCENT generated a centroid factor analysis. This function performed a correlation matrix (see Table 7) among the respondents' Q-sort raw data and extracted the unrotated factors (see Table 8). In extracting the factors, PQMethod associate statements that are more similar to each other than to the others in identify the factors.

At this stage in the execution of the analysis, the researcher had to decide how to handle the number of unrotated factors. For the purposes of this study eight factors were selected (see Table 8). The fourth step required making another decision--choosing to either manually rotate the unrotated factors (QROTATE) or allowing the program (PQMethod) to perform this task (QVARIMAX). The investigator chose the latter (QVARIMAX). Several additional decisions then needed to be made. The first was determining the number of unrotated factors to be rotated. All eight factors were selected for rotation, resulting in the factor matrix shown in table 9. The next decision was associating the individual respondent sorts with the factors. To accomplish this step all factors with loadings greater than .60 were "flagged" for varimax rotation (see Table 9). Finally, QANALYZE performed a Q-analysis on the flagged rotated factors.

Table 7. Correlations Matrix Between the 12 Respondents

		(n = 60 statements)											
Sort		1	2	3	4	5	6	7	8	9	10	11	12
1	1.00												
2	.36	1.00											
3	-.05	.12	1.00										
4	-.23	-.19	.17	1.00									
5	.20	.32	.01	-.12	1.00								
6	.35	.38	-.13	-.27	.28	1.00							
7	.30	.22	.18	-.08	.25	.04	1.00						
8	.35	.27	.08	.01	.01	.21	.33	1.00					
9	.21	.46	.23	-.11	.13	.23	.50	.42	1.00				
10	.19	.24	.01	-.27	.20	.41	.48	.29	.39	1.00			
11	.20	.39	.23	-.02	.33	.18	.35	.09	.38	.33	1.00		
12	.32	.25	.07	.04	.54	.23	.29	.34	.25	.19	.31	1.00	

Table 8. Unrotated Factor Matrix

Sort	Factors							
	1	2	3	4	5	6	7	8
1	-.5675	-.2834	.0278	-.3866	-.1612	.4371	-.0934	-.4222
2	-.6639	-.0738	-.0463	.1138	-.5376	.0238	-.2033	.2420
3	-.1663	.6934	.0019	.2137	-.3267	.1357	.5399	-.1665
4	.2667	.6063	-.2576	-.3650	-.0474	-.4306	-.2416	-.2024
5	-.5236	-.1196	-.6894	.1204	.1882	.0402	.1135	.1879
6	-.5339	-.5414	-.0095	.0213	-.2357	-.4250	.1971	-.1961
7	-.6386	.3271	.2107	.0349	.4614	.2409	-.0992	-.0360
8	-.5363	.1328	.3513	-.6067	-.0291	-.1324	.1037	.1321
9	-.6860	.2857	.3390	.0829	-.1107	-.0576	-.1270	.3029
10	-.6320	-.1205	.3185	.2575	.3921	-.3161	.1252	-.1695
11	-.6009	.2658	-.2255	.3906	-.0678	-.0554	-.3439	-.2789
12	-.5935	.0814	-.5112	-.3611	.1805	-.0095	.1536	.1108

In Q-methodology the Q-sort statements (for this study 60 statements were used) comprise the sample. The sample statements are administered to experts (participants) in a series of mini experiments or Q-sort, in which they distribute the statements along a continuum. This produces a matrix that models their responses to the potential changes to VTE in Trinidad and Tobago. The experts are considered the variables, and the statements are the sample. When the 12 sets of responses in this study were

intercorrelated with the 60 statements, they produced a 12 by 60 rectangular matrix on which Q-factor analysis and varimax rotation were performed to discover the smallest group of factors explaining the commonalties and variances in the population.

Table 9. Factor Matrix

Respo- ndent ID	Factors								Respondent Characteristic
	1	2	3	4	5	6	7	8	
1	.11	-.13	.14	.17	.14	.14	-.04	.92	Service Industry Expert
2	-.01	-.13	.19	.10	.85	.20	.05	.18	Manufacturing Expert
3	.08	.08	.02	.03	.10	-.07	.98	-.03	Education Expert
4	-.11	.93	.00	.03	-.09	-.15	.09	-.12	Education Expert*
5	.11	-.12	.88	-.17	.17	.12	-.02	.00	Education Expert*
6	-.01	-.13	.16	.09	.20	.87	-.08	.17	Manufacturing Expert*
7	.82	-.07	.20	.20	.12	-.19	.09	.19	Business Expert
8	.21	.10	.07	.83	.17	.13	.03	.21	Business Expert
9	.47	-.07	.03	.39	.64	.02	.13	-.07	Business Expert
10	.74	-.16	.06	.11	.03	.54	-.02	-.06	Service Industry Expert
11	.49	.26	.22	-.37	.52	.14	.15	.18	Labor Expert*
12	.13	.13	.82	.28	.07	.07	.04	.19	Labor Expert

Note: * indicates experts who completed both the Concourse and Q-sort questionnaires

In the presentation of the factor analysis results, references are made to the statements used in the Q-sort. For these references, the first number is the statement number. The corresponding statement then follows. A listing of the Normalized Factor Scores for Factors 1-8 is presented in *Appendix F*. In this study, the distinguishing Q-sort statement(s) associated with each factor were used to determine a factor title or name associated with each factor. However, since Factor 4 emerged with no distinguishing statement to capture the identity of the factor, the statements that received factor-array rankings of 5 and 4 became the actual descriptors for that factor title.

Specific Q-methodology Terms

To aid in clarifying the Q-methodology and research results, the definitions of several words and phrases are provided below:

1. *Factor array* designates a Q-sort constructed from factor analysis results, in which the factors of similar clusters of objects are rank-ordered and then fitted into the original Q distribution. This new synthetic Q-sort is a description of the factors. Usually

only the top or bottom, two or three piles of the Q distribution are used for interpretative purposes (Kerlinger, 1986).

2. *Factor analysis* is any of several methods of analysis that enable researchers to reduce a large number of variables to a smaller number of variables. Factor analysis is completed by finding patterns among the variations in values of several variables. In factor analysis a cluster of highly intercorrelated variables define a factor (Brown, 1986).

3. *Factor loadings* are entries (values) in the factor matrix that express the correlation between the respondent Q-sort and the factors. They range from -1.00 through 0 to +1.00 (Kerlinger, 1986).

4. *Factor matrix* is a table of coefficients that expresses the relations between the respondents Q-sort and the underlying factors (Kerlinger, 1986).

5. *Factor rotation* refers to any of several methods in factor analysis by which the researcher attempts to relate the calculated factors to theoretical entities. This is achieved differently depending on whether the factors are related or unrelated (Brown, 1986).

6. *P-set* is a term designating the sample of persons expected to have viewpoints pertaining to the problem under investigation (McKeown & Thomas, 1988).

7. *Q-sample* refers to a collection of stimulus items, such as the 60 statements used in this study that was presented to the experts for rank-ordering in a Q-sort. In Q-sort the sample can be either naturalistic or ready-made, and either unstructured or structured (McKeown & Thomas, 1988).

8. *Varimax rotation* is a method of rotation of the axes in factor analysis, whereby the axes are kept at 90° (ninety degrees) relative to each other (Brown, 1986)

Concourse Questionnaire

This section presents results from the concourse questionnaire (Survey, Part 1). It was not part of the research questions; however, the concourse questionnaire was useful in identifying and gathering the statements used in the Q-sort (Survey, Part 2). Eight of the 29 experts responded to the concourse questionnaire. The responders consisted of three experts from education, two from international development, and one each from manufacturing, labor and service industries. A total of 54 statements were received from the eight experts. Each of the experts' concepts, embedded in their responses, were teased out by an independent editor and organized into single sentences, resulting in a total of 66 statements. The 66 statements were judged by an independent panel of 3 judges to determine which of the edited statements best reflected the experts' views. Three edited statements, the judges believed, did not reflect the respondents' views and were not retained for use in the Q-sort. Three sets of two edited statements were found to be redundant; thus, one statement from each set was retained for use.

Q-sort Analysis

This section presents results of the Q-sort analysis and their linkage to the research questions. Through the use of Q-methodology, perceived changes identified by respondents were organized as factors. Each factor helps to clearly define the dimension

of the needs through its distinguishing statement and the placement of the ranked statements in the factor array.

For this study, research question 1 required the experts to identify VTE changes that are potential contributors to the economic development of Trinidad and Tobago. Research question 2 compelled the experts to rank-order the identified changes to VTE on a forced-choice continuum from *most important* to *least important*. Because of the way the analysis was performed using the program (PQMethod), results for the two research questions were difficult to separate. Therefore, the answers to both research questions unfolded simultaneously as discussed below.

P-set

Fifteen of the 29 experts responded to the Q-sort instrument. However, three responses were incomplete and were rejected for further analysis. The remaining 12 usable response documents came from two experts each in the fields of labor, manufacturing, and service industries; and three each from business and education. Four of the 12 Q-sort experts completed both the Q-sort and concourse questionnaires. Experts completing both questionnaires consisted of one expert each from manufacturing and labor and two from education. These respondents are identified in Table 9 with an asterisk (*).

Respondent Q-sort Findings

In the resulting factor solution (see Table 9), each expert's ranking displayed a significant loading of .40 or greater on at least one of the eight factors. Table 9 revealed that nine of the 12 experts were factorially "pure" loaders (i.e. had factor loading greater than .45 and did not load at a significant level on any other factor). Three experts (9, 10, and 11) were factorially complex loaders (i.e., had factor loading greater than .40 on more than one factor).

Expert rankings displayed no consensus around which of the suggested changes to vocational and technical education in Trinidad and Tobago would, in the next 3-5 years, significantly enhance economic development potential (for example; high skills/high wage employment, reduction in unemployment, increased industrial and service activities, development of global workplaces, and similar results). The experts appear to have varying conceptual understandings of knowledge, attitudes, and expectations; and these diverse perceptions were illuminated by the Q-sorting process.

Examining correlations among the factors was also necessary to determine the number of factors needed for rotation. Factors that are highly correlated with one another are considered to have the same family resemblance and do not correlate with members of other families. On any given pair of factors, negative correlations reflect bipolar agreement and positive correlations reflect agreement. Correlation values can range from -1.00 through 0 to 1. The low correlations among the factors indicate that they are relatively independent of each other and confirm the decision to include the eight factors in the factor matrix.

In effect, each of the eight factors represents a distinctive understanding, interpretation, or expectation of the potential changes to vocational and technical education that may improve economic development. The low correlation values among

the factors (range = -.2719 to .3834) indicate that they do indeed represent eight distinct opinion types (see Table 10).

Table 10. Correlations Among Factors

Factors	1	2	3	4	5	6	7	8
1	1.0000							
2	-.1793	1.0000						
3	.3143	-.0644	1.0000					
4	.3663	.0117	.1617	1.0000				
5	.3748	-.1910	.3352	.3510	1.0000			
6	.2100	-.2719	.2909	.2076	.3834	1.0000		
7	.1306	.1667	.0394	.0760	.1704	-.1257	1.0000	
8	.2930	-.2251	.2793	.3480	.3582	.3538	-.0497	1.0000

Having now reviewed the carefully described and tabulated results of the Q-sort analysis, the reader can better understand how those results formed the analytically rich turf from which grew answers to the salient research questions selected for this investigation. This process unfolds in the remaining sections of this chapter.

Research Questions

This investigation sought to answer two research questions:

- What perceived changes to VTE have the potential to improve the development of Trinidad and Tobago economy in the next 3 to 5 years?
- Which of the identified changes to VTE will have the greatest impact on the economic development of Trinidad and Tobago?

In the pages that follow, eight factors are tabulated and analyzed in the context of the research methodology previously described. These tables display in columnar form (a) five numbered statements that clustered around each designated factor; (b) each statement's perceived weight of importance on a 1-5 scale, with 1 and 2 being ranked the most important and 3, 4, and 5 being ranked the second most important; (c) the z-score statistically derived for each numbered statement, and (d) the probability of significance level associated with each statement's statistical measure of importance. As the results unfold, the answers to the research questions begin to crystallize.

Analysis of Tabulated Factors

Factor 1 (Access to and quality of VTE)

The distinguishing statement that characterized Factor 1 was number 38:

38. VTE should address the issues of unequal access and inferior quality of education—conditions that abound at all levels in Trinidad and Tobago ($p < .05$).

As can be seen in table 11 (Factor 1) and Appendix G1, statement 38 had a respondent factor array ranking of 4 and a z-score of 1.73.

Table 12 shows the five most important statements associated with Factor 1 listed by weighted importance. Rankings of 5 and 4 represent respectively the experts' most important and second most important perceptions of the potential changes to VTE that offer value as contributors to the economic development of Trinidad and Tobago. In the factor array for Factor 1, statements 57 and 7 were ranked 5; and statements 38, 56 and 33 were ranked 4.

Table 11. Factor Array for Factors 1-8

Factor 1										
-5	-4	-3	-2	-1	0	1	2	3	4	5
25	4	19	13	1	2	6	3	9	33	7
59	45	22	15	12	5	10	11	27	38	57
	55	24	26	32	8	14	21	35	56	
		58	30	34	16	17	23	52		
			42	37	18	28	31			
			49	41	20	29	48			
			60	46	39	36	51			
				47	43	40				
				54	44	50				
					53					

Factor 2

-5	-4	-3	-2	-1	0	1	2	3	4	5
49	27	18	5	1	7	2	16	4	14	13
58	33	22	17	3	12	6	19	8	21	45
	59	23	44	9	15	10	20	25	55	
		26	48	31	28	11	24	41		
			51	42	29	36	34			
			52	43	30	40	37			
			54	46	32	53	60			
				47	35	56				
				50	38	57				
					39					

Factor 3

-5	-4	-3	-2	-1	0	1	2	3	4	5
12	21	3	22	5	8	11	1	2	9	7
38	24	28	25	13	15	14	4	19	18	35
	41	45	36	26	17	16	6	40	51	
		58	42	32	20	23	10	47		
			44	43	29	27	30			
			55	48	31	52	37			
			59	49	33	54	46			
				50	34	57				
				56	39	60				
					53					

Factor 4

-5	-4	-3	-2	-1	0	1	2	3	4	5
25	16	8	4	1	18	2	3	7	5	51
47	26	38	19	6	28	12	9	17	14	56
	33	58	22	10	32	15	11	24	37	
		60	31	13	40	20	27	35		
			34	23	42	21	30			
			41	29	46	36	39			
			54	44	49	43	52			
				45	50	53				
				48	55	57				
					59					

Factor 5

-5	-4	-3	-2	-1	0	1	2	3	4	5
4	25	37	26	6	1	12	7	9	2	8

19	28	44	29	21	3	14	10	46	5	59
	41	45	33	22	11	17	18	51	27	
		58	38	23	13	32	31	53		
			43	24	15	35	40			
			49	34	16	36	57			
			54	47	20	48	60			
				55	30	50				
				56	39	52				
					42					

Factor 6

-5	-4	-3	-2	-1	0	1	2	3	4	5
4	24	41	21	11	1	3	2	17	12	5
10	25	42	23	14	35	7	6	19	15	9
	26	45	34	16	39	8	27	30	20	
		55	38	28	44	13	33	40		
			56	29	46	18	53			
			57	36	47	22	58			
			59	37	48	31	60			
				43	49	32				
				50	51	54				
					52					

Factor 7

-5	-4	-3	-2	-1	0	1	2	3	4	5
30	15	3	10	23	4	2	7	1	21	13
39	16	36	12	25	18	5	8	11	26	14
	29	37	17	28	20	6	9	46	56	
		42	19	32	22	24	41	57		
			27	34	35	38	53			
			31	45	40	43	59			
			33	48	44	51	60			
				49	47	52				
				55	50	54				
					58					

Factor 8

-5	-4	-3	-2	-1	0	1	2	3	4	5
25	29	6	8	4	1	2	5	27	31	35
47	45	21	11	7	3	9	12	37	51	43
	49	28	22	16	10	13	17	52	60	
		59	34	23	14	18	36	54		

41	32	15	20	40
55	39	19	30	42
56	44	24	46	48
	53	26	50	
	57	33	58	
		38		

Note: The Q-sort continuum ran from -5 to 5, with “least important” receiving a rank of -5 and “most important” receiving a ranking of 5. Participants were instructed to select and identify 25 “most important” statements and then rank-order from 5 to 2. From the remaining statements, participants were instructed to select and identify 25 “not important” statements and rank-order from -5 to -2. In presenting the results, the reader will be directed to factor arrays. References are made to positions (ranking) of an item in the array.

Table 12. First 5 Most Important Perceived VTE Changes Associated with Factor 1

Stat. No.	Statement	Rank	Z Score	Sig.
57.	VTE instructors should be retrained in real world problem solving skills and in relevant industry competencies.	1	2.21	p<.05
7.	VTE programs should be updated often to reflect rapid changes in technology and working methods.	2	1.73	p<.05
38.	VTE should address the issues of unequal assess and inferior quality of education—conditions that abound at all levels in Trinidad and Tobago.	2	1.73	p<.05
56.	VTE should be integrated with mainstream academics in the early school years, thus exposing younger students to a broader range of specialties from which to choose.	4	1.63	p<.05
33.	Government VTE institutions should recognize the private-sector’s role in vocational and technical education—namely, providing incentives to facilitate skills development in the workplace.	5	1.53	p<.05

Factor 1 had one factorially pure loader (Expert # 7; See table 9) with a correlation of .82 and three factorially complex loaders (Experts # 9, 10, and 11) with correlation of .47, .74, and .49 respectively. Factor 1 had an average reliability coefficient of .800 and a composite reliability of .889. It accounted for 15% of the explained variance in the varimax rotation factor matrix.

Factor 2 (VTE higher education programs)

The following four distinguishing statements characterized Factor 2:

45. VTE should produce a cadre of engineers capable of working in product design and manufacturing ($p < .01$).
55. VTE courses should be added to UWI engineering programs emphasizing manufacturing and design ($p < .01$).
25. UWI should modify its matriculation requirements to insure that incoming students have previous exposure to vocational and technical subjects ($p < .01$).
18. VTE institutions should strengthen their linkage to the industrial sector ($p < .05$).

As can be seen in Table 11 (Factor 2) and Appendix G2, statement 45 had a factor array ranking of 5 and a z-score of 2.08. Statements 55, 25, and 18 had factor array rankings of 4, 3, and -3 and z-scores of 1.66, 1.25 and -1.25 respectively.

In the factor array for Factor 2, statements 13 and 45 were ranked 5, and statements 14, 21 and 55 were ranked 4. Table 13 displays the five most important statements clustered around Factor 2 and the levels of importance attached to them by the experts. Factor 2 had one factorially pure loader (Expert # 4; See table 9) with a correlation of .93. Factor 2 had an average reliability coefficient of .800 and a composite reliability of .800. It accounted for 9% of the explained variance in the varimax rotation factor matrix.

Table 13. First 5 Most Important Perceived VTE Changes Associated With Factor 2

Stat. No.	Statement	Rank	Z Score	Sig.
13.	VTE should be properly aligned at the primary and secondary levels as an integral part of the total education system.	1	2.08	p<.05
45.	VTE should produce a cadre of engineers capable of working in Product Design and Manufacturing.	1	2.08	p<.05
14.	VTE should be constructed as an integral part of the total education system and not merely as a response to problems and difficulties plaguing the educational system.	3	1.66	p<.05
21.	VTE should revise existing primary and secondary levels systems, and reform curricula at both levels to focus on learning the basic literacy and mathematics skills in a way that inspires students to be creative in learning.	3	1.66	p<.05
55.	VTE courses should be added to UWI engineering programs emphasizing manufacturing and design.	3	1.66	p<.05

Factor 3 (VTE program quality)

The distinguishing statement that characterized Factor 3 was as follows:

47. VTE should insure that their program quality measures meet international standards (p<.05).

As can be seen in table 11 (Factor 3) and Appendix G3, statement 47 had a factor array ranking of 3, a z-score of 1.22, and was significant at p<.05.

In the factor array for Factor 3, statements 7 and 35 were ranked 5, and statements 9, 18 and 51 were ranked 4. Table 14 displays the five most important statements clustered around Factor 3 and the level of importance attached to them by the experts. It had two factorially pure loaders (Expert # 5 and 12; See table 9) with correlation of .88 and .82 (p<.05). Factor 3 had an average reliability coefficient of .800 and a composite reliability of .889. It accounted for 13% of the explained variance in the varimax rotation factor matrix.

Table 14. First 5 Most Important Perceived VTE Changes Associated With Factor 3

Stat. No.	Statement	Rank	Z Score	Sig.
7.	VTE programs should be updated often to reflect rapid changes in technology and working methods.	1	1.98	p<.05
35.	VTE programs should reflect the development needs of the country and meet Government's developmental goals with a strong focus in IT.	2	1.78	p<.05
18.	VTE institutions should strengthen their linkage to the industrial sector.	3	1.69	p<.05
9.	VTE teachers should stay abreast of new technologies in the workplace by continual study and periodic on-site industry visits or work assignments.	4	1.61	p<.05
51.	VTE should insure high quality-standards at all levels of skill development.	5	1.50	p<.05

Factor 4 (VTE program comprehensiveness)

Factor 4 had no distinguishing statements. In the factor array for Factor 4, statements 51 and 56 were ranked 5 and statements 5, 14 and 37 were ranked of 4 (See Table 11). Table 15 shows the statement importance, z-score, and significant level of importance for the five most important statements associated with Factor 4.

Factor 4 had one factorially pure loader (Expert # 8; See table 9) with correlation of .83 (p<.05). Factor 4 had an average reliability coefficient of .800 and a composite reliability of .800. It accounted for 10% of the explained variance in the varimax rotation factor matrix.

Table 15. First 5 Most Important Perceived VTE Changes Associated With Factor 4

Stat. No.	Statement	Rank	Z Score	Sig.
51.	VTE should insure high quality-standards at all levels of skill development.	1	2.08	p<.05
56.	VTE should be integrated with mainstream academics in the early school years, thus exposing younger students to a broader range of specialties from which to choose.	1	2.08	p<.05
5.	VTE should incorporate skill training at high-level especially in computer literacy, information and communication technologies to propel the country forward in its ability to compete globally.	3	1.66	p<.05
14.	VTE should be constructed as an integral part of the total education system and not merely as a response to problems and difficulties plaguing the education system.	3	1.66	p<.05
37.	VTE administrators should educate students, parents, and communities on the advantage of vocational and technical training.	3	1.66	p<.05

Factor 5 (Fundamental aspects of VTE)

The following distinguishing statement characterized Factor 5:

19. VTE institutions should correct the misperception that vocational and technical program is for underachievers (p<.05).

As can be seen in table 11 (Factor 5) and Appendix G5, statement 19 had a factor array ranking of -5, a z-score of -2.21.

In the factor array for Factor 5, statements 8 and 59 were ranked 5 and statements 2, 5 and 27 were ranked 4. Table 16 shows the statement importance, z-score, and significant level of importance for the five most important statements associated with Factor 5. It had one factorially pure loader (Expert # 2; See table 9) with correlation of .85 and two factorially complex loaders (Expert # 9 and 11). Correlation values for the complex loaders were .64 and .54 respectively. Factor 5 had an average reliability coefficient of .800 and a composite reliability of .889. It accounted for 13% of the explained variance in the varimax rotation factor matrix.

Table 16. First 5 Most Important Perceived VTE Changes Associated With Factor 5

Stat. No.	Statement	Rank	Z Score	Sig.
8.	VTE should be rooted in the knowledge-based society, from which new technologies grow and ultimately permeate all aspects of commerce.	1	2.21	p<.05
59.	VTE should include basic life skills (conflict resolution, self-awareness and control, family life and sex education) as an integral part of vocational and normative education.	2	1.84	p<.05
2.	VTE programs should incorporate job-site training as part of the curriculum.	3	1.50	p<.05
5.	VTE should incorporate skill training at high-levels especially in computer literacy, information and communication technologies to propel the country forward in its ability to compete globally.	4	1.40	p<.05
27.	VTE should offer ongoing programs to stay abreast of rapidly changing technology and working methods.	4	1.40	p<.05

Factor 6 (Preparation for and advancement in VTE careers)

The following two distinguishing statements characterized Factor 6:

- 15. VTE institutions should require programs to network and/or work closely with organizations to introduce students to the workplace and world of work (p<.05).
- 10. VTE institutions should offer experienced employees an opportunity to obtain the certification needed for career advancement (p<.05).

As can be seen in table 11 (Factor 6) and Appendix G6, statement 15 had a factor array ranking of 4 and a z-score of 1.66. Statement 10 had factor array rankings of -5 and a z-score of -2.08.

In the factor array for Factor 6, statements 5 and 9 were ranked 5 and statements 12, 15 and 20 were ranked 4. Table 17 shows the statement importance, z-score, and significant level of importance for the five most important statements associated with Factor 6.

In the factor array for Factor 6, statements 5 and 9 were ranked 5 and statements 12, 15 and 20 were ranked 4. Table 17 shows the statement importance, z-score, and

significant level of importance for the five most important statements associated with Factor 6.

Table 17. First 5 Most Important Perceived VTE Changes Associated With Factor 6

Stat. No.	Statement	Rank	Z Score	Sig.
5.	VTE should incorporate skill training at high-level especially in computer literacy, information and communication technologies to propel the country forward in its ability to compete globally.	1	2.08	p<.05
9.	VTE teachers should stay abreast of new technologies in the workplace by continual study and periodic on-site industry visits or work assignments.	1	2.08	p<.05
12.	VTE programs throughout Trinidad and Tobago should be equivalent in scope and design.	3	1.66	p<.05
15.	VTE institutions should require programs to network and/or work closely with organizations to introduce students to the workplace and world of work.	3	1.66	p<.05
20.	VTE should hire better-qualified teachers with industrial experience to instruct technicians in manufacturing products.	3	1.66	p<.05

Factor 6 had one factorially pure loader (Expert # 6; See table 9) with correlation of .87 and one factorially complex loader (Expert # 10). Correlation value for the factorially complex loader was .54. Factor 6 had an average reliability coefficient of .800 and a composite reliability of .800. It accounted for 10% of the explained variance in the varimax rotation factor matrix.

Factor 7 (Meeting VTE student and program needs)

The three distinguishing statements listed below characterized Factor 7:

26. VTE institutions should develop a unified organization to deal with and solve problems related to at-risk youth ($p < .01$).
39. VTE should increase the number of students enrolled in its programs ($p < .01$).
30. VTE should be more widely offered in Trinidad and Tobago ($p < .05$).

As can be seen in table 11 (Factor 7) and Appendix G7, statement 26 had a factor array ranking of 4 and a z-score of 1.66. Statements 39 and 30 had factor array rankings of -5 and z-scores of -2.08 respectively.

In the factor array associated with Factor 7, statements 13 and 14 were ranked 5 and statements 21, 26 and 56 were ranked 4. Table 18 shows the statement importance, z-score, and significant level of importance for the five most important statements associated with Factor 7. It had one factorially pure loader (Expert # 3; See table 9) with correlation of .98. Factor 7 had an average reliability coefficient of .800 and a composite reliability of .800. It accounted for nine percent of the explained variance in the varimax rotation factor matrix.

Factor 8 (Understanding VTE's purpose)

The single distinguishing statement below characterized Factor 8:

43. VTE should acknowledge that creating employment is the reason for providing this form of education ($p < .05$).

As can be seen in table 11 (Factor 8) and Appendix G8, statement 43 had a factor array ranking of 5, a z-score of 2.08, and was significant at $p < .01$.

In the factor array associated with Factor 8 statements 35 and 43 received rankings of 5 and statements 31, 51 and 60 received rankings of 4. Table 19 shows the statement importance, z-score, and significant level of importance for the five most important statements associated with Factor 8. It had one factorially pure loader (Expert # 1; See table 9) with correlation of .92. Factor 8 had an average reliability coefficient of .800 and a composite reliability of .800. It accounted for nine percent of the explained variance in the varimax rotation factor matrix.

Table 18. First 5 Most Important Perceived VTE Changes Associated With Factor 7

Stat. No.	Statement	Rank	Z Score	Sig.
13.	VTE should be properly aligned at the primary and secondary levels as an integral part of the total education system.	1	2.08	p<.05
14.	VTE should be constructed as an integral part of the total education system and not merely as a response to problems and difficulties plaguing the education system.	1	2.08	p<.05
21.	VTE should review existing primary and secondary levels systems, and reforming curricula at both levels to focus on learning the basic literacy and mathematics skills in a way that inspires students to be creative in learning.	3	1.66	p<.05
26.	VTE institutions should develop a unified organization to deal with and solve problems related to at-risk youth.	3	1.66	p<.05
56.	VTE should be integrated with mainstream academics in the earlier school years, thus exposing younger students to a broader range of specialties from which to choose.	3	1.66	p<.05

In the above analysis, the statements are reflective of potential changes and are organized into factors. The factors, though distinct, are nevertheless interrelated and represent the holistic nature and direction of projected change for VTE in Trinidad and Tobago. They also appear to reflect a starting point for a comprehensive program in which the dimensions of change encompass the importance-statements as illuminated in this study. Thus the results reveal a multifaceted set of potential changes that could positively impact the entire VTE system.

Table 19. First 5 Most Important Perceived VTE Changes Associated With Factor 8.

Stat. No.	Statement	Rank	Z Score	Sig.
35.	VTE programs should reflect the development needs of the country and meet Government's developmental goals with a strong focus in IT.	1	2.08	p<.05
43.	VTE should acknowledge that creating employment is the reason for providing this form of education.	1	2.08	p<.05
31.	VTE should engage the local business leaders in determining their needs and anchoring program plans in the local needs of industry and commerce.	3	1.66	p<.05
51.	VTE should insure high quality-standards at all levels of skill development.	3	1.66	p<.05
60.	VTE should develop a long-term plan for vocational and technical education and training.	3	1.66	p<.05

Summary

This chapter began with a discussion of the PQMethod and Q-factor analysis as they applied to this study. In order to facilitate the reader's ability to accurately understand the nature and value of the analysis being presented, the researcher first defined specific Q-methodological terms. Next, came a presentation of the concourse questionnaire and Q-sort results, inasmuch as they contained preliminary information related to answers for the two research questions.

Respondents first identified changes to VTE that offered promising possibilities for strengthening and expanding the economic development of Trinidad and Tobago in the next 3 to 5 years. Then the respondents rank-ordered the identified changes in order of importance. An analysis of the resulting data uncovered eight relatively distinct topical areas, organized around groups or clusters of factors identified--namely, these: (a) access to and quality of VTE, (b) VTE higher education programs, (c) VTE program quality, (d) VTE program comprehensiveness, (e) fundamental aspects of VTE, (f) preparation for and advancement in VTE careers, (g) meeting VTE students and program needs, and (h) understanding VTE's purpose. All factors were significant (p<.05).

Perceived changes to VTE that have the potential to improve the development of Trinidad and Tobago's economy in the next three to five years are congruent with the identified factors. Each factor has its own distinctive set of potential changes to VTE. The importance of these changes derived from Q-sort rankings provided by the experts. Chapter 6 discusses the implications of the findings and their potential value to the

country of Trinidad and Tobago and to policymakers, industry leaders, and VTE researchers and practitioners worldwide

Chapter VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The role of vocational and technical education (VTE) in the economic development of countries has been increasingly recognized (Anderson & Bowman, 1976; Chin-Aleong, 1988; Middleton, Ziderman, & Adams, 1993; World Bank, 1991). As a result, VTE has become an essential element in the economic development plans of many countries. However, in recent years, globalization and technological advances propelled diversification of economies in numerous countries, and thereby intensified economic competition between nations. This more diverse and competitive economic landscape compelled a re-examination of the future role of VTE in strengthening a country's economic growth and development.

Summary

Need for the Study

Trinidad and Tobago: background. The southernmost country of the Caribbean Islands nations, Trinidad and Tobago has the most diverse economy of all the islands, with economic activity in five sectors: agriculture, energy, manufacturing, financial and related services, and tourism. Almost 1,500,000 inhabitants of richly diverse backgrounds (predominantly African and East Indian descent) reside on the two islands, with only 50,000 living in Tobago. Trinidad and Tobago has the most diverse economy of all the islands in the Caribbean and is very sophisticated for a country of its size. Endowed with relatively rich deposits of crude oil and natural gas, Trinidad and Tobago became one of the most prosperous countries in the Western Hemisphere during the oil boom of the 1970s. Oil revenues financed the government's two-fold expansion: first, the government invest heavily in education, especially VTE; second, it embarked on a rapid industrial and infrastructure development program. Part of this was the acquisition of more than 60 state-run enterprises. The collapse of oil prices in the early 1980s proved problematic for both expansionary efforts, eventually becoming a serious drain on public finances. Nevertheless, stringent adjustment programs in the late 1980s spurred a shift in Trinidad and Tobago's economy--from central planning to free-market policies which resulted in extensive trade and investment liberalization, divestment of state enterprises, and an emphasis on economic diversification and export-led growth.

Trinidad and Tobago: the contemporary challenge. The challenges imposed by a technology-driven global economy compels the country to harness such technologies for use in the nation's own industrial sector. Changes brought about by rapid industrialization, plant modernization, increasing use of technology in the workplace, globalization, free markets--and the resultant increased need for quality world-class production and education--are affecting Trinidad and Tobago's national economy and education system.

An assessment of the country's human resources reveals several deficiencies. Despite the impressive increase in enrollment in education and training institutes at all levels since independence, an acute shortage remains in three critical categories:

professionals, managers, and technicians. Moreover, only a small proportion of the labor force in those categories have benefited from either VTE or university education. Outputs from Trinidad and Tobago's post-secondary higher level institutions, especially in the technical fields, fall far short of the requirements for sustaining technological advancement.

VTE courses and skill preparation activities have proliferated in state and private schools and institutions, causing duplication and other problems related to certificates, diplomas, and miscellaneous requirements. Many occupational areas and disciplines are involved, and all levels are affected--from craftsman to professional. Even so, assessment of the quality of the proliferating VTE programs is hampered by (a) lack of formal quality benchmarks and (b) absence of a proven, sound VTE assessment methodology. Thus, no framework for establishing a coherent and harmonized VTE system exists. In this absence of a rational system of VTE curriculum assessment, certification types have proliferated, resulting in a confused public, especially among stakeholders and employers (Karim, 1999).

Several education studies (Grover et al., 2000; Ministry of Education, n.d; United Nation Development Project, 1998; World Bank, 1999) in Trinidad and Tobago report considerable concern regarding the appropriateness of the present purpose of education and training. In particular, questions arise as to whether the curricula, programs, and teaching methods provide the requisite skills and knowledge essential to meet the country's challenges as it enters into the global arena. Traditionally, schooling--with a strong focus on academic subjects and examinations--used an unintegrated approach to foster desired attitudes and qualities, and to instill a desire and capacity for continuous learning and growth. Education specialists from international development agencies confirm the urgent need in Trinidad and Tobago to improve the quality of education at all levels generally, and particularly at levels involving the teaching of science and technology. Moreover, the specialists urge the nation's education leaders to establish closer links with industry and the world of work.

Conceptual Framework

In human capital investment theory, education is a form of economic investment; consequently, the value of education is measured by its contribution to economic growth, increased employment, and a higher standard of living. A nation's education policies are tied to doctrines of economic growth through the creation of market economies. Hence, this study builds on the symbiotic relationship between education and economic development and growth; it focuses on globalization, technological changes, and human capital investment as developed as explicated by Berryman and Bailey (1992).

Globalization fosters economic policies designed to promote trade liberalization and encourage greater competition in a world that is becoming more interdependent while competition spans national borders. Another aspect of globalization is its ability to transform a society's social structure, creating new potentials and limits for education to pave the way for technological changes. Technological changes transform and diversify workplaces and workforces and differentiate skills and knowledge needed for success in the global economy (Kincheloe, 1999; Smith, 1995).

These altering conditions have changed the requirements for economic success by demanding (a) linkage to VTE and (b) a stronger emphasis on factors that were less important to traditional mass-production systems. Thus, the prospect for economic success suggests both dismal and exciting consequences as major considerations for technological changes in the workplace. Such changes have typically been omitted from VTE. However, despite such omissions, many national governments and international donor organizations support VTE because it possesses the potential to link education with employment, to improve productivity, and ultimately to strengthen economic development. VTE's focus on human capital investment is designed to provide individuals with the necessary skills needed for potential employment. With this focus, VTE can become instrumental in economic growth by elevating the skills and knowledge of the workforce (Spring, 1998).

Purpose and Design

Purpose. The purpose of this study was to determine what direction VTE programs in Trinidad and Tobago should take to enhance future employment opportunities and further foster the economic development of the country. To achieve this purpose, the following research questions defined the magnitude and scope of the research:

- What perceived changes to VTE have the potential to improve the development of Trinidad and Tobago's economy in the next three to five years?
- Which of the identified changes to VTE will have the greatest impact on the economic development of Trinidad and Tobago?

Participants. A group of 29 experts from a cross-section of Trinidad and Tobago was included in the study. Those selected consisted of four experts from each of the following areas: (a) international development organizations, (b) business, (c) economists, (d) labor, (e) manufacturing, and (f) service industries. Additionally five experts were asked to participate from the local educational leadership area. To qualify as an expert, educators from international developmental organizations were required to meet three of the following criteria: (a) possess knowledge of VTE or economic development in Trinidad and Tobago by holding an administrative position, (b) be identified as the most qualified in the organization to assist the research, (c) be a professional who has successfully published one or more works in the field of VTE or economic development, and (d) be currently employed (the year 2001) in Trinidad and Tobago.

Individuals identified in the other career fields were required to meet two of three criteria to be considered an expert. These criteria consisted of (a) having at least five years of work experience in the field of VTE or economic developmental activities including labor representation; (b) serving in a position of educational leadership, and (c) being identified as the most qualified in the organization to assist the research.

Of the 29 experts responding to the concourse probe questionnaire (Survey Part I), the eight who responded consisted of three persons from education, two from international developmental agencies, and one each from manufacturing, labor, and service industries. Of the 29 experts who received the Q-sort instrument (Survey Part II),

15 responded. However, three responses were incomplete, compelling the investigator to discard them in terms of further analysis. The remaining 12 usable response-documents were from experts representing the following fields: two each from labor, manufacturing, and service industries; and three each from business and education. Of the 12 experts whose responses were retained for further analysis, four also completed the concourse probe questionnaire. Those four experts included one person from manufacturing, one from labor and two from education.

Instruments. This investigation used two instruments. The first instrument--a concourse probe questionnaire--was used to gather the statements for use in the second instrument, the Q-sort. Candidates identified for the study by the previously described criteria received an e-mail soliciting their participation. The soliciting email letter asked them to list five to eight statements enumerating--based on their knowledge and experience--what specific changes to VTE in Trinidad and Tobago they believed would have the strongest potential for improving economic development (e.g., high skills/high wage employment, reduction in unemployment, increased industrial and service sector activities, development of global workplaces) in the next three to five years. A week after sending the initial e-mail, the investigator sent a follow-up reminder, asking the experts to complete and return their lists of five to eight statements. One week after that the candidates received a second reminder.

The second instrument--Q-sort, required experts to select, identify, and rank-order pre-determined quantities of the 60 statements collected by the concourse probe. To facilitate this task, the investigator developed a dynamic database and linked it to the World Wide Web. Experts received an e-mail requesting their participation and directing them to log on to the web-site. When the experts logged on to the web-site, on-screen instructions directed them to complete a number of tasks. First, they selected and identified 25 "important" statements. Second, they had to rank-order their selected important statements by varying degrees of importance. Specifically, instructions directed the experts to select the two most important statements, the next three, the next four, and the next seven, assigning them rankings of five, four, three, and two respectively. Third, they selected and identified the 25 "not important" statements from the remaining original list of statements. The experts then rank-ordered their selected "not important" statements in a similar manner as they did with the important statements.

Data Collection

Data collection was a two-phase process. In the first phase, experts received an e-mail asking them to complete the concourse probe questionnaire. Seven days after the initial e-mail a reminder was sent, asking experts to complete and return their questionnaires. Due to widespread computer virus contamination in Trinidad and Tobago, many experts were unable to access their e-mail accounts at the time of the initial e-mailing. Five weeks after the initial e-mailing, all experts were asked a second time, via e-mail, to complete the concourse probe questionnaire. A reminder e-mail message was sent to each non-respondent on the fifth and ninth day after the second request.

In the second phase, experts received an e-mail requesting their participation to complete a Q-sort. The e-mail contained a hyper-link to the Q-sort database site on the

World Wide Web. Experts' selections were instantly registered at a server and results were downloaded as required. On the third, sixth, ninth, and twelfth days after the initial request for participating in the Q-sort, participants received a reminder e-mail message requesting their participation.

Data Analysis. The investigation used two data analysis methods: concourse probe analysis and Q-factor analysis. With the concourse probe, experts' responses were revised for content and were modified to ensure single concepts were used. The resulting statement reflected the original content of the statements received. Then, an independent three-judge panel was asked to examine the statements and to determine if they reflected the original views expressed by the experts.

The Q-factor analysis was applied to the participants' Q-sort using several steps. First, the 60 Q-sort statements were entered into PQMethod-QSTATES file. Second, experts' Q-sort data were entered into the QENTER file. The third step required the computation of a correlation matrix among the Q-sort participants. This was achieved by executing the PQMethod-QCORR (Centroid factor analysis) function. The fourth step required the rotation of factors identified by the centroid factor analysis. This step was accomplished by executing QVARIMAX (verimax rotation of the factors). Last, the QANALYZE was selected to perform the final Q analysis of the rotated factors. This resulted in a variety of tables of factor loadings, statement factor scores, discriminating factors, and consensus statements across factors.

Findings

Concourse probe. The concourse probe collected 54 statements from 8 experts (3 education, 2 international development, 1 each from labor, manufacturing and service industries). From the original 54 statements, 66 revised statements crystallized. Two of the statements were not related to vocational and technical education changes and were dropped from further analysis. Three sets of two statements were expressed duplicate content, thereby necessitating the retention of only one from each for use in the Q-sort.

Q-Factor analysis. Results from the Q-sort analysis helped explicate the research questions. Q-methodology generated the transformation of the perceived changes into organized factors. Each factor helped to clearly define the dimension of the needs through its distinguishing statement and the placement of the ranked statements in the factor arrays.

For the purpose of this study, research question 1 required the group of experts to identify VTE changes they believed to be potential contributors to the economic development of Trinidad and Tobago. Research question 2 required the experts to rank-order the identified changes on a forced-choice continuum from *most important* to *least important*. Because the program (PQMethod) performed the task of analysis, separating the results was difficult. Hence the answers to both research questions emerged in tandem, inextricably interwoven.

An examination of the correlation among the factors indicated that the factors are relatively independent of each other and confirmed their inclusion in the factor matrix. In effect, each of the eight factors represents a distinctive understanding, interpretation, or expectation of the potential changes most likely to improve VTE. The eight factors are as

follows: (a) access to and quality of VTE, (b) VTE higher education programs, (c) VTE program quality, (d) VTE program comprehensiveness, (e) fundamental aspects of VTE, (f) preparation for and advancement in VTE careers, (g) meeting VTE student and program needs, and (h) understanding VTE's purpose. All factors were significant ($p < .05$).

Factor 1 (access to and quality of VTE) accounted for 15 % of the variance in the factor matrix and was distinguished by the statement: VTE should address the issues of unequal access and inferior quality of education--conditions that abound at all levels in Trinidad and Tobago. The five most important statements that clustered around Factor 1 in their order of importance were as follows:

VTE instructors should be retrained in real world problem solving skills and in relevant industry competencies.

VTE programs should be updated often to reflect rapid changes in technology and working methods.

VTE should address the issues of unequal access and inferior quality of education—conditions that abound at all levels in Trinidad and Tobago.

VTE should be integrated with mainstream academics in the early school years, thus exposing younger students to a broader range of specialties from which to choose, and Government

VTE institutions should recognize the private-sector's role in vocational and technical education—namely, providing incentives to facilitate skills development in the workplace.

Factor 2 (VTE higher education programs) accounted for nine percent of the explained variance in the factor matrix and was distinguished by the following statements:

VTE should produce a cadre of engineers capable of working in product design and manufacturing.

VTE courses should be added to UWI engineering programs emphasizing manufacturing and design.

UWI should modify its matriculation requirements to insure that incoming students have previous exposure to vocational and technical subjects

VTE institutions should strengthen their linkage to the industrial sector.

The five most important statements that clustered around Factor 2 in the order of importance were as follows:

VTE should be properly aligned at the primary and secondary levels as an integral part of the total education system.

VTE should produce a cadre of engineers capable of working in product design and manufacturing.

VTE should be constructed as an integral part of the total education system and not merely as a response to problems and difficulties plaguing the educational system.

VTE should revise existing primary and secondary levels systems, and reform curricula at both levels to focus on learning the basic literacy and mathematics skills in a way that inspire students to be creative in learning.

VTE courses should be added to UWI engineering programs emphasizing manufacturing and design.

Factor 3 (VTE program quality) accounted for 13 % of the explained variance in the factor matrix and was distinguished by the statement: VTE should insure that their program quality measures meet international standards. The five most important statements that clustered around Factor 3 in the order of importance were as follows:

VTE program should be updated often to reflect rapid changes in technology and working conditions.

VTE programs should reflect the development needs of the country and meet Government's developmental goals with a strong focus on IT.

VTE institution should strengthen their linkage to the industrial sector.

VTE teachers should stay abreast of new technologies in the workplace by continual study and periodic on-site industry visit or work assignment.

VTE should insure high quality-standards at all levels of skill development.

Factor 4 (VTE program comprehensiveness) accounted for 10% of the explained variance in the factor matrix and had no distinguished statements that characterized it. However, the five most important statements that clustered around Factor 4 in the order of importance were as follows:

VTE should insure high quality-standards at all levels of skill development.

VTE should be integrated with mainstream academics in the early school years, thus exposing younger students to a broader range of specialties from which to choose.

VTE should incorporate skill training at high-level especially in computer literacy, information and communication technologies to propel the country forward in its ability to compete globally.

VTE should be constructed as an integral part of the total education system and not merely as a response to problems and difficulties plaguing the education system.

VTE administrators should educate students, parents, and communities on the advantage of vocational and technical training.

Factor 5 (fundamental aspects of VTE) accounted for 13% of the explained variance in the factor matrix and was distinguished by the following statement: VTE should correct the misperception that vocational and technical program is for underachievers. The five most five important statements that clustered around Factor 5 in the order of importance were as follows:

VTE should be rooted in the knowledge-based society, from which new technologies grow and ultimately permeate all aspect of commerce.

VTE should include basic life skills (conflict resolution, self-awareness and control, family life and sex education) as an integral part of vocational and normative education.

VTE programs should incorporate job-site training as a part of the curriculum.

VTE should incorporate skill training at high-levels especially in computer literacy, information and communication technologies to propel the country forward in its ability to compete globally.

VTE should offer ongoing programs to stay abreast of rapidly changing technology and working methods.

Factor 6 (preparation for and advancement in VTE careers) accounted for 10% of the explained variance in the factor matrix and was distinguished by the following statements:

VTE institutions should require programs to network and/or work closely with organizations to introduce students to the workplace and the world of work.

VTE institutions should offer experienced employees an opportunity to obtain the certification needed for career advancement.

The five most important statements that clustered around Factor 6 in the order of importance were as follows:

VTE should incorporate skill training at high-levels especially in computer literacy, information and communication technologies to propel the country forward in its ability to compete globally.

VTE teachers should stay abreast of new technologies in the workplace by continual study and periodic on-site industry visit or work assignment.

VTE programs throughout Trinidad and Tobago should be equivalent in scope and design.

VTE institutions should require programs to network and/or work closely with organizations to introduce students to the workplace and the world of work.

VTE should hire better-qualified teachers with industrial experience to instruct technicians in manufacturing products.

Factor 7 (meeting VTE students and program needs) accounted for nine percent of the explained variance in the factor matrix and was distinguished by the following statements:

VTE institutions should develop a unified organization to deal with and solve problems related to at-risk youth.

VTE should increase the number of students enrolled in its programs, and

VTE should be more widely offered in Trinidad and Tobago.

The five most important statements that clustered around Factor 7 in the order of importance were as follows:

VTE should be properly aligned at the primary and secondary levels as an integral part of the total education system.

VTE should be constructed as an integral part of the total education system and not merely as a response to problems and difficulties plaguing the education system.

VTE should revise existing primary and secondary levels systems, and reform curricula at both levels to focus on learning the basic literacy and mathematics skills in a way that inspires students to be creative in learning.

VTE institutions should develop a unified organization to deal with and solve problems related to at-risk youth.

VTE should be integrated with mainstream academics in the earlier school years, thus exposing younger students to a broader range of specialties from which to choose.

Factor 8 (understanding VTE's purpose) accounted for nine percent of the explained variance in the factor matrix and was distinguished by the following statements:

VTE should acknowledge that creating employment is the reason for providing this form of education.

The five most important statements that clustered around Factor 8 in the order of importance were as follows:

VTE programs should reflect the development needs of the country and meet Government's developmental goals with a strong focus on IT.

VTE should acknowledge that creating employment is the reason for providing this form of education.

VTE should engage the local business leaders in determining their needs and anchoring program plans in the local needs of industry and commerce.

VTE should insure high quality-standards at all levels of skill development.

VTE should develop a long-term plan for vocational and technical education and training.

Conclusions

Based on the findings of this study several conclusions can be derived. The methodology worked exceptionally well in providing answers to the research questions. Despite the lack of participation by economists in both the concourse questionnaire and Q-sort, the results provide valuable information that can be used by VTE decision-makers to improve current programs in Trinidad and Tobago. Q-methodology is not constrained by the number of participants (variables) but rather by the number of statements (sample). The number of participants in a Q-sort is a function of the number of stimuli used; whereas the number of stimuli is governed by the convenience and statistical demand (Kerlinger, 1986, Thompson, 1981, Thompson and Miller, 1983). Therefore, the number of participants (experts) does not affect the number of stimuli (statements) and the results were derived from an acceptable number of statements. Kerlinger (1986) recommended the number of stimuli (statements) should be no less than 60. Further, Brown (1980) argued that the selection of participants is a theoretical matter, and the goal is

representiveness, but not in the random-sampling sense: as in the sampling of statements, breadth and diversity are more important than proportionality.

The results confirmed the model conceptual framework that VTE can contribute to economic development. However, in the case of Trinidad and Tobago, several factors need to be taken into consideration. Those factors emerged from within the 60 statements derived from the concourse questionnaire representing a holistic approach to VTE. Thus the results go beyond a laundry list of what to do as the factors exemplify broad areas of changes and provides direction for these proposed changes.

The focus of this study was on what direction VTE may take to improve the economy of Trinidad and Tobago. As such the results focused the changes that are required for the future. These proposed changes (factors) which did not exist before, can serve as an outline for what could be done in the future to link VTE programs to the economic development of Trinidad and Tobago. Further, the cluster of statements associated with each factor may aid in the development of a plan of action for making these changes possible.

Scholars continue to probe the merits and designs of VTE programs in developed as well as developing nations. Herschbach (1998), as well as Middleton and Ziderman (1997) argued forcefully that VTE's contribution to a particular country's economic development is unique and should be designed to support and enhance the country's economic environment. Zeroing in on developing countries, Herschbach (1998), Herschbach, Hays, and Evans (1991), and Psacharopoulos (1991) note the failure of numerous VTE programs in such nations, and cite as the primary reason, a lack of understanding about the importance of the education-economic relationship. The results derived from this study cannot be compared or contrasted directly to results from similar studies conducted in other countries. A synthesis of the results, organized by the key factors derived and analyzed, is nevertheless valuable.

Factor 1 (Access to and quality of VTE) is the strongest factor. Basu (1998) viewed access to and quality of VTE as the largest challenge for VTE professionals in the 21st century--globally, regionally and nationally. He further stated that

. . . in the twenty-first century, the quality of a country's human resources will determine its ability to compete in international markets and assure the well being of its citizens. VTE represents the best possible long-term investment for growth and human development (p. 248).

According to Middleton and Ziderman (1997), implementing and sustaining quality VTE programs in developing countries presents complex problems to policy makers. They attribute this problem to uncertain and unstable implementing environment, lack of financial resources, and few guidelines for determining which educational interventions have the reasonable probability of being sustained. However, Herschbach (1998) suggested that the ability to implement and sustain quality VTE programs is conditioned by micro and macro-level factors. Micro-level factors refer to the political and economic climate, social and cultural values, and the legal and bureaucratic structures within a particular country setting. Macro-level factors include availability of financial resources, the supply of trained personnel, access to instructional resources, supporting organizations, stakeholder groups, and other human and material resources.

Some similarities exist in the findings of this study and the policy recommendations offered by Grover et al., (2000, n.p.). In the first chapter, the authors presented policy recommendations for education reforms:

There are two main components of education reform: (i) improving access to education; and (ii) improving educational quality. Therefore, specific policies need to be developed to address these components. Suggested changes include: (i) strict enforcement of educational requirements by the government; (ii) increasing the number of qualified teachers; (iii) improving the quality of teachers; (iv) developing a long term educational plan to access the skills that will be required by the workforce and to plan for the development of these skills through the education system; (v) systematic planning and coordination among the various educational institutions and programs; (vi) revision of the curriculum to make it more relevant to the workplace; (vii) rationalizing the organizational structures, administration, budgeting, and internal administration procedures; (viii) providing career guidance and counseling to students in schools; (ix) developing programs to improve linkages between parents, communities, students and employers; and (x) developing concrete steps to address the current gender and geographic inequalities in education.

A comparison of the authors' policy suggestions and results of this study show that the most important factor in this investigation (Factor 1--access to and quality of VTE) is a combination of two main educational reform components offered by Grover, et al (2000) and is embedded in their tenth policy recommendation. The two second-most important factors elucidated by this study (Meeting International Standards and Correcting Misperceptions of VTE) are not a part of the above authors' recommendations.

Factor 1(access to and quality of VTE) is consistent with earlier findings (World Bank, 1996). World Bank (n.d.) revealed a pattern of systematic exclusion of certain youth from education and employment. The Word Bank attributed this systematic exclusion to unequal access to quality education, outdated teaching methods and learning assessments, lack of adequate or appropriate instructional materials, unsatisfactory school conditions, and overcentralized and inefficient administration and service delivery from the Ministry of Education to the schools.

A United Nations Development Project (1998) reported that Trinidad and Tobago needs better and more vocational and technical education (a) to help its people move out of the increasingly devalued, unskilled labor force and (b) to acquire the skills necessary to meet the needs for skilled labor. Because economic growth and diversification are rapidly increasing, the economic base the country is running out of skilled people. The dwindling number of well-qualified people entering the workforce on one side, and the growing demands for people with deeper and broader occupational skills on the other, has spearheaded this dramatic change. New technologies, expanding international trade, and the increasing importance of new and small business are also driving this demand. Thus, by increasing access to and improving the quality of VTE, the country may alleviate the problem alluded to in the United Nations report.

Q-methodology performed well under the conditions imposed by this research. Specifically, Q methodology operated as a sophisticated feedback system in which the

statement set was given meaning and affective order by the behavior of the experts. Subsequently, Q-factor analysis of the experts' Q-sorts produced models or factors explaining different potential changes (opinion types) in the universe of discourse. Further, Q-methodology revealed the political or educational philosophy of individual experts and classify them into eight factors. In doing so, the methodology was able to show differences and similarities between the experts through their factor loading (factor array). In addition it revealed that statements used in the study were not content specific but rather derived their meaning based on experts' perceptions, education, experience, and exposure to Trinidad and Tobago VTE system and economic development. Thus, each Q-sort is an experiment in operant subjectivity in which experts were the variables and the statements the sample.

The statements identified in this study were obtained by surveying a group of experts from Trinidad and Tobago and may not be generalizable to any other country due to Trinidad and Tobago's unique position. However, the literature on VTE in the USA contains many of the statements derived from the concourse survey and used in this study. The prevailing differences between the economic, social, political, and educational conditions in Trinidad and Tobago and in the USA may result in a different set of factors or potential changes. The same may be true for any other country.

Lack of access to and quality of VTE programs is problematic not only for developing countries but also developed countries. In the USA, for example, the need for broad-based access to VTE and for high quality VTE programs has been a major focus for at least the last three-quarters of a century. It was brought to the forefront of the American VTE programs with debates by prominent philosophers and policy makers such as John Dewey and Charles Prosser and remained an integral part of the VTE landscape. More recently, lack of access to high quality VTE programs has been in highly acclaimed and controversial reports, such as (a) *A Nation at Risk* (1983), (b) *A Nation Prepared* (1986), (c) *America's Choice: High Skills or Low Wages!* (1990), (d) the *Secretary's Commission on Achieving Necessary Skills* (SCANS, 1992), and (d) the *Summary and Recommendations: National Assessment of Vocational Education* (1994). The situation was also addressed in the Carl D. Perkins Acts (Perkins I, II, and III). Failure to address this area--access to and quality of VTE--may continue to impede the economic development of Trinidad and Tobago.

Recommendations

Recommendations for Further Research

Considering the limited generalizability of this study, researchers may choose to replicate the study's methodology in other countries to ascertain the nature of VTE changes deemed to strengthen economic development in their selected countries. As noted previously, a country's education impinges on and is shaped by many factors within the political, cultural, socio-economic, legal, and bureaucratic structures. These factors may influence and affect any given country differently, resulting in no two nations being the same.

Future research on Trinidad and Tobago VTE should build on the results of this study to determine which of the identified factors may have the greatest pay-off for

educational and economic development of the nation. Each factor is unique and represents a different area of VTE interest. Also associated with each factor is a list of statements that describes potential needed changes. These statements help to define the factor and can act as a beacon to shape the direction, scope and magnitude of future research associated with the identified factors. Collectively, the five most important statements represent microcosms of their associated factors. Thus, there is potential for more detailed examination of the different factors.

Expanding Q-methodology through the use of computer technology as conducted in this study warrants further research. The opportunity for Q-methodology respondents to complete a Q-sort at a computer represents a potential breakthrough for the methodology and for information gathering. The computer-based response system developed for and used in this study has demonstrated the potential to gather information not only from developing countries but from any country in any context as it relates to the application of Q-methodology. However, the methodology also raises the following question: to what extent are people more or less likely to respond due to computer access, the World Wide Web, or the use of computer in general?

Recommendations for Application

The results of this study represent a comprehensive, holistic view of the changes required for VTE to contribute the economic development of Trinidad and Tobago. Thus, application of the results goes beyond any single government ministry. Due to the proliferation and duplication of VTE courses and skill preparation activities by several government ministries it may not be appropriate for any single ministry to attempt to apply the results from this study. It may be more useful for the results to be implemented by a single umbrella organization or agency that oversees VTE in its entirety. In such an environment, the full potential if the results may be realized.

The results may also have potential for policy changes. Each of the eight factors--access to and quality of VTE, VTE higher education programs, VTE program quality, VTE program comprehensiveness, fundamental aspects of VTE, preparation for and advancement in VTE careers, meeting VTE student and program needs, and understanding VTE's purpose--can represent a distinct change in education policy. At the policy level, the Ministry of Education could take the lead in developing, implementing, and supervising coordination of policies that can link VTE with the economic development of the nation. These policy changes should be developed as a collaborative effort among the different government ministries and private sector institutions that are engaged in VTE programming.

It is recommended that the University of the West Indies at St. Augustine, the College of Science, Technology and Applied Arts of Trinidad and Tobago, and the Community College Implementation Team program planners examine the results of this study. The objective of the examination would be to determine the value of this information for future collaboration in VTE program planning and curriculum development.

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Appendix A

Certification Levels of Vocational and Technical Education (VTE) in Trinidad and
Tobago

Appendix A

Certification Levels of Vocational and Technical Education (VTE) in Trinidad and Tobago

LEVELS OF CLASSIFICATION	CERTIFICATION TYPE	CERTIFYING ORGANIZATION	VTE PROVIDERS
LEVEL 1 Semi-Skilled	<ul style="list-style-type: none"> National Examinations Council (NEC) Certificate of Acquired Competencies NEC Certificate of Performance Youth Training and Employment Partnership Program (YTEPP) Certificate of Participation Technical Vocational Education and Training (TEVT) Certification of Participation National Energy Skills Center (NESC) Certificate of Participation 	<ul style="list-style-type: none"> National Examinations Council (NEC) Youth Training and Employment Partnership (YTEPP) National Energy Skills Center (NESC) National Skills Development Program / Metal Industries Company (NSDP/MIC) Technical, Vocational, Education and Training (TVET) Adult Education 	<ul style="list-style-type: none"> YTEPP Youth Development Apprenticeship Centers (YDAC) Trade Centers Unemployment Relief Training Programs (URTP) Non-Governmental Organizations (NGOs) Adult Education Community Centers Youth Training Centers (YTC) St. Michael's School for Boys (Industrial Orphanages) Retraining Programs Caribbean Fisheries Training Development Institute (CFTDI) Post Primary Centers
LEVEL 2 Skilled	<ul style="list-style-type: none"> TVET Certificate of Acquired Competencies NEC Craft Certificate NEC Certificate NESC Certificate of Completion Journeyman Master Craftsman 	<ul style="list-style-type: none"> NEC NESC NSDP/MIC/Fritz Werner MIC/NSDP/American Welding Society (AWS) MIC/Fritz Werner BIT 	<ul style="list-style-type: none"> Senior Comprehensive Schools YDACs Governmental Vocational Centers Technical Institutes (John S. Donaldson Technical Institute and San Fernando Technical Institute) Trinidad and Tobago Hospitality and Tourism Institute(THTI) YTEPP NESC MIC/NSDP

-
- CFTDI
-

LEVEL 3 Technician	<ul style="list-style-type: none"> • NEC Technician Diploma • NEC Diploma • Associate Degree 	<ul style="list-style-type: none"> • NEC • NIHERST • MIC/NSDP • NESC • TTHTI • Cipriani Labor College 	<ul style="list-style-type: none"> • Technical Institutes (John S. Donaldson Technical Institute and San Fernando Technical Institute) • TTHTI • Eastern Caribbean Institute of Agriculture and Forestry (ECIAF) • MIC/NSDP • NESC • Cipriani Labor College • National Institute of Higher Education, Research, Science and Technology (NIHERST)
LEVEL 4 Professional	<ul style="list-style-type: none"> • Bachelor of Science Degree (B.Sc.) • Higher National Diploma (HND) 	<ul style="list-style-type: none"> • NIHERST • University of the West Indies (UWI) 	<ul style="list-style-type: none"> • NIHERST • UWI
LEVEL 5 Advanced Professional	<ul style="list-style-type: none"> • Master of Science Degree (M.Sc.) • Doctor of Philosophy (Ph.D.) 	<ul style="list-style-type: none"> • University of the West Indies (UWI) • Professional Bodies 	<ul style="list-style-type: none"> • UWI • Professional Bodies

Note: Fazal, K. (1999). *Trinidad and Tobago country paper*. Presented at ILO-TVET meeting St. Lucia October 27–29, 1999. Trinidad and Tobago, International Labor Organization. Reprinted with permission.

Appendix B

Public Vocational and Technical Education (VTE) Providers in Trinidad and Tobago

Appendix B

Public Vocational and Technical Education (VTE) Providers in Trinidad and Tobago

Government Ministry	VTE Provider	Course	Industrial Sector
Education	John S. Donaldson Technical Institute	Building and Civil Engineering, Welding Craft/Plumbing Craft	Construction
Education	John S. Donaldson Technical Institute	Telecommunications Engineering Technician, Auto and Diesel Craft	Distribution (Transportation, Communications and Storage)
Education	John S. Donaldson Technical Institute	Business Management Technician, Executive Secretary Technician, Accounting Technician	Finance, Insurance, Real Estate and Business Services
Education	John S. Donaldson Technical Institute	Jewelry Craft, Construction, Carpentry and Joinery Craft	Miscellaneous Manufacturing, Wood and Related Products
Education	John S. Donaldson Technical Institute	Dietary Technician	Personal Services (Health Services)
Education	John S. Donaldson Technical Institute	Printing Technician II, Offset Printing and Platemaking Craft, Graphic Design, Camera Operation and Copy Preparation Craft	Manufacture (Printing, Publishing and Paper Converters)
Education	John S. Donaldson Technical Institute	Mechanical Engineering Technician, Process Plant Operator, Home Economics Technician (Food and Nutrition or Clothing and Textile), Machine Shop Craft	Other
Education	John S. Donaldson Technical Institute	Electrical/Electronic, Engineering Technician, Air Conditioning, Electrical Installation Craft	Electricity, Gas and Water
Education	John S. Donaldson Technical Institute	Tailoring Craft (levels 1 & 2), Basic Dressmaking and Design Craft (Accelerated), Intermediate Dressmaking and Design Craft, Advanced Dressmaking and Design Craft	Garment, Footwear and Headwear
Education	Governmental Vocational Centers	Construction Carpentry, Welding Craft	Construction

Education	Governmental Vocational Centers	Electrical Installation Craft (Electrical Wireman), Electrical Installation Craft (Industrial Electrician) General Maintenance Fitter, Industrial Instrumentation Mechanic, Mechanical Engineering Technical	Electricity, Gas and Water
Education	Governmental Vocational Centers	Cabinet Making	Manufacture (Wood and Related Products)
Education	Adult Education Unit	Plumbing, Welding,	Construction
Education	Adult Education Unit	Food Preparation, Cake Icing and Decorating	Distribution (Hotel and Guest Houses)
Education	Adult Education Unit	Auto Mechanic	Distribution (Transportation, Communication and Storage)
Education	Adult Education Unit	Hair Dressing, Beauty Culture	Personal Services
Education	Adult Education Unit	Dressmaking and Design, Fabric Design, Garment Construction, Tailoring	Manufacture (Textiles, Garments, Footwear and Headwear)
Education	Adult Education Unit	Book Binding	Printing, Publishing and Paper Converters
Education	Adult Education Unit	Woodworking	Wood and Related Products
Education	Adult Education Unit	Bread and Pastry	Food, Beverage and Tobacco
Education	Adult Education Unit	Basketry, Cluster Craft (a) Floral Arrangement and Construction, (b) Macrame, (c) Soft Toys, (d) Crochet, (d) Craft from local and discarded materials, (e) Upholstery	Miscellaneous Manufacturing
Education	San Fernando Technical Institute	Food Preparation and Culinary Arts	Distribution (Hotel and Guest Houses)
Education	San Fernando Technical Institute	Auto / Diesel Mechanic Craft, Telecommunication Engineering Technician	Distribution (Transportation, Communication and Storage)
Education	San Fernando Technical	Domestic Electronics Servicing Crafts, Electrical / Electronics	Electricity, Gas and Water

	Institute	engineering Technician, Refrigerator and Air-Conditioning Technician	
Education	San Fernando Technical Institute	Basic Dressmaking and Design Craft, Intermediate Dressmaking and design Craft Advanced Dressmaking and Design Craft	Manufacture (Textiles, Garments, Footwear and Headwear)
Education	San Fernando Technical Institute	Shorthand Typist, Clerk Typist, Business Management Technician, Executive Secretary Technician, Computer Programming Technician	Finance, Insurance, Real Estate and Business Services
Education	San Fernando Technical Institute	General Maintenance Fitter, Instrument Maintenance, Machine Shop Craft, Process Plant Operator, Mechanical Engineering Technician, Industrial Instrumentation Engineering Technician, Home Economics Technician (Food and Nutrition, Clothing and Textile)	Other Sector
Education	San Fernando Technical Institute	Construction Engineering Technician, Civil Engineering Technician, General Draughtsmanship	Construction
Education	San Fernando Technical Institute	Printing Technician, Graphic Design Technician	Manufacture (Printing, Publishing and Paper Converters)
Education	San Fernando Technical Institute	Dietary Technician	Personal Services (Health Service)
Social and Community Development	Servol Life Center	Garment Construction, Tailoring	Manufacture (Textiles, Garments, Footwear and Headwear)
Social and Community Development	Servol Life Center	Carpentry and Joinery	Wood and Related Products
Social and Community Development	Servol Life Center	Electrical Installation, Electronics	Electricity, Gas and Water
Social and Community Development	Servol Life Center	Masonry, Plumbing, Welding	Construction
Social and Community Development	Servol Life Center	Auto Mechanic	Distribution (Transportation, Communication and Storage)

Social and Community Development	Servol Life Center	Food Preparation	Distribution (Hotel and Guest Houses)
Social and Community Development	Servol Life Center	Beauty Culture, Home Health Aide, Child Care	Personal Service (Health Service)
Social and Community Development	Servol Life Center	Computer Literacy	Education and Cultural Community Services
Energy and Energy Industries	National Energy Skills Center (NESC)	Construction Millwright, Construction Electrical Instillation, Instrument Fitting, Pipefitting / Fabricator, Advanced Welding, Specialized Alloy Coded Welding, Carbon Steel Welding, Large Bore Diameter Pipe Welding, Industrial Maintenance, Masonry, Carpentry, Blue Print Reading and Measurement, Surface Finishing, Painting, Environment Law	Construction
Energy and Energy Industries	National Energy Skills Center	Health / Safety, Health, Safety, Environment	Personal Services
Energy and Energy Industries	National Energy Skills Center	Electrical /Electronic Engineering, Industrial Codes Welding to AWS Standards	Electricity, Gas and Water
Energy and Energy Industries	National Energy Skills Center	Petroleum and Gas Engineering	Petroleum
Energy and Energy Industries	National Energy Skills Center	Instrumentation and Controls, Mechanical Engineering, Fluid Power Control, Programmable Logic Controllers, Introduction to Distributive Control Systems, Basic Principles of Statistical Process Control, Applications to Statistical Process Control, Introduction to CAD/CAM,	Any Industry
Energy and Energy Industries	NESC in Collaboration with Metal Industries Company (MIC)	Process Control and Instrumentation	Any Industry
Energy and Energy Industries	NESC in Collaboration with MIC	Occupational Health and Safety to OSHA Standards	Personal Services
Energy and Energy	NESC in Collaboration	Completion Design for New Wells, Practical Economics for	Petroleum

Industries	with the Ministry of Energy and Energy Industries and Rike Services Industries	Oil and Gas Production	
Energy and Energy Industries	NESC in Collaboration with Bechtel Corp., Phoenix Gas Processors, Ministry of Energy and Energy Industries and Trinidad Bureau of Standards	Contracting in the Global Context, Enhancing Capabilities for Successful Bidding	Petroleum
Energy and Energy Industries	NESC in Collaboration with the Ministry of Energy and Energy Industries and Conger and Elsea Inc (USA)	Accident Investigation and Root Cause Analysis	Petroleum
Energy and Energy Industries	NESC in Collaboration with MIC	Professional Skills Training as a Coded Welder	Construction
Energy and Energy Industries	NESC in Collaboration with Southern Alberta Institute of Technology	Modern Maintenance Management Techniques, Materials Management / Service Supply Chain, Corrosion Control, Welding and Fusion Technology, Introduction to Lubricants Technology and Application, Pressure Vessels / Equipment, Safety and Environment, Environment Auditing	Construction
Information, Communications, Training and Distance Learning	Youth Training and Employment Partnership Program (YTEPP)	Construction Carpentry, Building Construction, Masonry, Plumbing, Industrial Welding, Fabrication, Light Welding and Fabrication	Construction
Information, Communications, Training and Distance Learning	YTEPP	Aerobes Instructor (Assistant), Dog Handler, Pet Services, Dogs, Floral Arrangement and Construction	Recreational Services
Information,	YTEPP	Light and Heavy Vehicle Maintenance Serviceman, Engine	Distribution (Transportation,

Communications, Training and Distance Learning		Tune-up/Trouble Shooting, Auto Electrical Maintenance and Repairs, Agro Mechanic, Diesel Engine Mechanic, Auto Body Repair	Communication and Storage)
Information, Communications, Training and Distance Learning	YTEPP	Tour Guide/Escort (Domestic), Waiter/Waitress, Room Maid, Cookery, Catering, Environmental Custodial Services, Interior Design	Distribution (Hotel and Guest Houses)
Information, Communications, Training and Distance Learning	YTEPP	Building Electrical Assistant, Industrial Electrical Assistant (Maintenance), Industrial Electrical Assistant (Installation), Electrician Assistant, Radio Receiver Servicing and Repair, Audio Systems Servicing and Repair, Color TV Servicing and Repair, Domestic Appliances Servicing and Repair, Domestic Refrigeration Servicing and Repairs, Window Air Conditioning Servicing and Repair, Auto Air Conditioning Service and Repair, Office Machine Mechanic	Electricity, Gas and Water
Information, Communications, Training and Distance Learning	YTEPP	Hair Dressing, Barber Styling, Beauty Therapy, Cosmetology	Personal Services
Information, Communications, Training and Distance Learning	YTEPP	Care of the Elderly, Child Care, Care of the Sick in the Home, Home Management Services	Health Services
Information, Communications, Training and Distance Learning	YTEPP	Typist, Receptionist, Clerk, Sales Clerk/Cashier, Store Clerk, Skills for the Automated Office (Computer Literacy / Word Processing / Spreadsheet Application and Data Bases, Computer Graphics)	Finance, Insurance, Real Estate Service
Information, Communications, Training and Distance Learning	YTEPP	Cabinet Making (Joinery and Furniture Design, Construction and Repair), Cabinet Making (Storm Protective Services), Boat Building and Repair	Manufacture (Wood and Related Products)
Information, Communications, Training and Distance Learning	YTEPP	Small Part and Simple Tool Making, Costume Jewelry, Soft Toys, Leather Craft, Mixed Craft, Ceramics, Weaving – Cane Work, Weaving – Local Materials, Bamboo, Coconut, Calabash Craft, Woodcraft (Toys, Ornaments, Utilities), Wire Craft	Miscellaneous Manufacturing

Information, Communications, Training and Distance Learning	YTEPP	Dressmaking and Design, Male and Female Sportswear Specialty, Lingerie Specialty, Household Furnishings, Shirt and Trousers Construction, Male and Female Accessories (Caps, Hats, Neck-ties/Scarves, Bags), Shoemaking and Repair, Upholstery, Industrial Garment Construction, Screen Printing, Textile Design and Print	Manufacture (Textile, Garment, Footwear and Headwear)
Information, Communications, Training and Distance Learning	YTEPP	Fruit and Vegetable Preservation, Confectionery Making (Hand), Local Beverage and Desert Making Preservation, Cake Making and Decorating, Bread Cake and Pastry Making	Food, Beverages and Tobacco
Information, Communications, Training and Distance Learning	YTEPP	Large Scale Production of Vegetables, Production of Vegetables, Grow Box System, Ornamental Horticulture, Hydroponics, Soil Testing, Fruit Farming, Small Ruminants Farming, Herb and Condiment Production, Fish Farming (Fresh Water Fishing) Lawns and Landscape Management, Honey Production, Pet Fish Farming, Plant Propagation	Agriculture
Information, Communications, Training and Distance Learning	MIC / National Skills Development Program	Electrical / Electronic Trade, Electrical Engineering, Mechanical Engineering, Electrical Installation	Electricity, Gas and Water
Information, Communications, Training and Distance Learning	MIC / National Skills Development Program	Welding, Machine Shop, Industrial Maintenance	Construction
Information, Communications, Training and Distance Learning	MIC / National Skills Development Program	Safety	Personal Service
Information, Communications, Training and Distance Learning	Board of Industrial Training	Welding	Construction
Information, Communications, Training and Distance Learning	Board of Industrial Training	Electrical Installation	Electricity, Gas and Water
Information, Communications, Training	Board of Industrial Training	Offset Printing	Manufacture (Printing, Publishing and Paper Converters)

and Distance Learning			
Information, Communications, Training and Distance Learning	Board of Industrial Training	Auto and Diesel Mechanic, Machine Shop Craft	Distribution (Transport, Communication and Storage)
Sport and Youth Affairs	Youth and Community Centers	Accounts and Business, Computer Studies, Shorthand and Typing, Marketing, Accounts and Small Business	Finance, Insurance, Real Estate and Business Services
Sport and Youth Affairs	Youth and Community Centers	African Batik, Dressmaking and Designing, Fabric Design, Garment Construction, Tailoring, Home Furnishings	Manufacture (Textiles, Garments, Footwear, Headwear)
Sport and Youth Affairs	Youth and Community Centers	Furniture and Art Craft, Woodturning Craft	Wood and Related Products
Sport and Youth Affairs	Youth and Community Centers	Crochet, Upholstery, Leather Craft	Miscellaneous Manufacturing
Sport and Youth Affairs	Youth and Community Centers	Food Preservation	Food, Beverage and Tobacco
Sport and Youth Affairs	Youth and Community Centers	Book Binding	Manufacture (Printing, Publishing and Paper Converts)
Sport and Youth Affairs	Youth and Community Centers	Cookery, Cake Decorating, Pastry Making, Floral Arrangement, Interior Decorating	Distribution (Hotel and Guest Houses)
Sport and Youth Affairs	Youth and Community Centers	Beauty Culture, Hair Dressing	Personal Services
Sport and Youth Affairs	Youth and Community Centers	Ballroom Dancing, Caribbean Folk Dancing, Gymnastics, Guitar Lessons, Karate, Personal Development through Drama, Popular Theatre, Self Defense, Drumming	Recreational Services
Sport and Youth Affairs	Youth and Community Centers	Sign Painting	Other
Culture, Land and Marine Resources	Farmers Training Center	Agrochemicals, Banana and Plantain Production, Cocoa Production, Compost Production, Citrus Production, Crop	Agriculture

		Production, Coffee Production, Farm Machinery, Farm Management, Food Crops, Horticulture, Livestock Production, Principles of Livestock Production, Principles of Crop Production, Principles of Livestock, Pineapple Production, Rabbit Production, Rice Production, Soil Conversation, Tropical Fruit Production, Vegetable Production	
	Trinidad and Tobago Hospitality and Training Institute	Cooks, Food and Beverage Supervisor, Restaurant Service, Front Office and Travel Agency Operations, Baking and Pastry Arts, Dinning Room Service, Culinary Management, Food and Beverage Management, Hotel Operations, Tourism Management	Distribution (Hotel and Guest Houses)
	School of Continuing Studies	Indian Delicacies	Manufacture (Food, Beverage and Tobacco)
	School of Continuing Studies	Fabric Design (Batik / Tie Dye), Tailoring (Shirts / Pants), Dress Design and Construction I / II, Shoe Covering, Draperies / Soft Furnishings, Screen Printing	Manufacture (Textiles, Garments, Footwear and Headwear)
	School of Continuing Studies	Joinery / Furniture Construction, Cabinet Making	Wood and Related Products
	School of Continuing Studies	Horticulture, Gardening, Vegetable Production, Aquaculture, Home Gardening	Agriculture
	School of Continuing Studies	Electrical Installation (Domestic), Electrical Installation (Industrial), Radio/TV/VCR Repair, Rewiring of Motors and Armatures, Small Appliance Repair, Air Conditioning and Refrigeration, Basic Electronics	Electricity, Gas and Water
	School of Continuing Studies	Auto Electrical Repairs (Horns, Starters, etc), Auto Mechanic (Service / Tune-up), Auto Mechanic (Transmission and Differential)	Distribution (Transportation, Communication and Storage)
	School of Continuing Studies	Business Accounting, Typewriting, Micro Entrepreneurship (Small Business Management), Public Relations, Computer Skills	Finance, Insurance, Real Estate and Business Services
	School of Continuing Studies	Cosmetology, Hair Cutting / Dressing, Health, Safety and	Personal Service

Studies	Environmental Management	
School of Continuing Studies	Floral Arrangement, Basic Art Drawing / Painting, Cake Decoration, Guitar/Key Board, Photography I/II/III, Harmonium, Latin / Ballroom Dancing	Recreational Services
School of Continuing Studies	Upholstery	Miscellaneous Manufacturing
School of Continuing Studies	Building Construction, Architectural Drawing, , Blue Print Reading and Drawing, Welding and Fabricating	Construction
School of Continuing Studies	Chinese Cookery, Small Scale Catering, Bread, Cakes and Pastry, Food and Drink Preparation, Interior Decoration, Small Hotel and Institutional Management, Tourism Management and Development	Distribution (Hotel and Guest Houses)

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Appendix C

Concourse Questionnaire and Associated E-mail

Appendix C1

E-mail to Selected Panel of Experts

Dr./ Mr./ Ms.

Title

Street address

City, Trinidad

West Indies

Date:

Dear Dr./Mr./Ms.

You have been identified as one of a few selected persons who have contributed to Trinidad and Tobago's development and/or vocational and technical education effort. It would be greatly appreciated if you would participate in a non-sponsored study on the future direction of vocational and technical education (VTE) in Trinidad and Tobago. As a citizen of Trinidad and Tobago, I am very sensitive to the needs in this area and as a doctoral student in VTE I have an opportunity to conduct research in this area.

You should be able to complete the attached questionnaire within 15 minutes. Later on, I will ask you to rank-order a group of statements on a continuum. You should be able to complete this part of the survey within 45 minutes.

Thank you for your participation and commitment to the economic development effort in Trinidad and Tobago.

Respectfully yours,

Errol Ramsaroop (Researcher)
Virginia Polytechnic Institute and State University
College of Human Resources and Education
Department of Teaching and Learning
119 Wallace Hall (0467)
Blacksburg, VA 24060
540-231-5471

Appendix C2

Survey Part 1

Based on your knowledge and experience please list 5 to 8 statements that give your views of what changes to vocational and technical education in Trinidad and Tobago have the potential to improve economic development (for example: high skills/high wage employment, reduction in unemployment, increased industrial and service sector activities, development of global workplaces) in the next 3 to 5 years.

Example: Vocational and technical education programs need to refocus effort by teaching broad-based occupational skills.

1.

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Appendix C3

Reminder E-mail

Dr./ Mr./ Ms.
Title
Street address
City, Trinidad
West Indies

Date:

Dear Dr./Mr./Ms.

Recently you received a questionnaire regarding a research I am conducting titled "Vocational and Technical Education Changes that are Potential Contributors to the Economic Development of Trinidad and Tobago." As of (month, day), 2001 I have not received your responses. Because of your experience and expertise in Vocational and Technical Education, Economic Development, Labor, Trade and Industry in Trinidad and Tobago, your response is very important for this study.

Attached with this email, please find a copy of the Informed Consent for Participants Permission (Consent.doc) to review the high standards established to protect your anonymity and confidentiality and the questionnaire (SURVEY.doc). If you have not already done so, please take about 15 minutes, complete the questionnaire and return it by email to eramsaro@vt.edu by (month, day), 2001. Your contribution to this study is essential and greatly appreciated.

Best regards

Errol Ramsaroop (Researcher)
Virginia Polytechnic Institute and State University
College of Human Resources and Education
Department of Teaching and Learning
119 Wallace Hall (0467)
Blacksburg, VA 24060
540-231-5471

Appendix D

Edited Respondent Statements

Appendix D

Edited Respondent Statements

1. Vocational and technical education should correct the current misperception that the vocational-technical program is for underachievers.
2. Vocational and technical training programs throughout Trinidad and Tobago should be equivalent in scope and design.
3. Vocational and technical education should link their programs to Trinidad and Tobago's business structure allowing graduated to move into management in order to earn higher remuneration.
4. Vocational and technical programs should incorporate management training as part of their student technical education skills.
5. Vocational and technical training should be rooted in the knowledge-based society from which new technologies grow and ultimately permeate all aspects of commerce.
6. Anticipate the steel pan becoming a major musical instrument in the near future, and accordingly, train technicians to produce them in the newly developing industry.
7. Vocational and technical education should be integrated with mainstream academics in the earlier school years, thus exposing younger students to a broader range of specialties from which to choose.
8. Vocational and technical education should offer experienced employees an opportunity to obtain the certification needed for career advancement.
9. Vocational and technical education should offer ongoing opportunities to stay abreast of rapidly changing technology and working methods.
10. Vocational and technical programs must likewise be updated often to reflect rapid changes in technology and working methods.
11. Vocational and technical programs should incorporate job-site training as part of the curriculum.
12. Vocational and technical administrators should work closely with employers to motivate employees to continue upgrading their vocational skills.
13. Vocational and technical education should delay introduction of VTE until the final years of high school or the first year of post-secondary school.

14. All vocational and technical education providers should come together and develop a unified plan to recognize VTE studies and discuss it nationally.
15. Vocational and technical institutions should establish a system of accrediting VTE programs and insure that institutions modify their structures accordingly.
16. Vocational and technical institutions should strengthen their linkage to the industrial sector.
17. Vocational and technical education studies should develop regional councils to insure that VTE studies adapt to regional demands.
18. Vocational and technical education should be more widely offered in Trinidad and Tobago.
19. Vocational and technical traditional subjects at lower grades should gradually incorporate technician-level information technology, telecommunications, electronics, and biotechnology.
20. Vocational and technical administrators should encourage companies to recognize and reward successful programs and competent graduates and administrators of outstanding technical institutes.
21. Vocational and technical education should develop a national system of articulation with higher level of education within Trinidad and Tobago educational system.
22. Vocational and technical institutions should include special classes as needed to insure that their students are both literate and numerate.
23. Vocational and technical education should produce graduates who can demonstrate to society that their studies lead to successful careers.
24. Vocational and technical education articulation should provide a smooth transition and clear path from technical school to a university-level degree.
25. Vocational and technical education institutions should negotiate with top-level industry leaders in order to secure work opportunities for trainees/graduates of programs.
26. Vocational and technical institutions should better manage education resources—plant, machinery, and consumables—to insure meaningful training and increased government allocations.

27. Vocational and technical teachers should stay abreast of new technologies in the workplace by continual study and periodic on-site industry visits or work assignments.
28. Vocational and technical education should be incorporated into subject areas taught at prestige school.
29. Vocational and technical administrators should educate students, parents, and communities on the advantages of vocational and technical training.
30. Vocational and technical education should increase the number of students enrolled in its programs.
31. Vocational and technical education should insure high quality-standards at all levels of skill development.
32. Vocational and technical education should insure that their program quality measures meet international standards.
33. Vocational and technical educational programs should insure that their program quality measures are relevant to the workplace.
34. Vocational and technical education should realistically evaluate secondary school curricula, insuring effective school-to-work transitions.
35. Vocational and technical institutions should require programs to network and/or work closely with organizations to introduce students to the workplace and world of work.
36. Vocational and technical education should improve guidance and counseling services for preparing students to select and pursue meaningful careers.
37. Vocational and technical institutions should develop a unified organization to deal with and solve problems related to at-risk youth.
38. Vocational and technical education should be properly aligned at the primary and secondary levels as an integral part of the total education system.
39. Vocational and technical educational programs should recognize the benefits of working together, sharing resources and ideas, and establishing mechanisms for solving common problems.
40. Vocational and technical education should engage the local business leaders in determining their needs and anchoring program plans in the local needs of industry and commerce.

41. Vocational and technical programs should provide the flexibility for students to pursue both academic and VTE simultaneously or to move between both streams with ease.
42. All public vocational-technical organizations must reevaluate, justify, and clarify their roles and objectives.
43. Government vocational and technical educational institutions should recognize the private-sector's role in vocational-technical education—namely, providing incentives to facilitate skills development in the workplace.
44. Vocational and technical educational programs should acknowledge that creating employment is the reason for providing this form of education.
45. Vocational and technical education should produce a cadre of engineers capable of working in Product Design and Manufacturing.
46. Vocational and technical education courses should be added to the UWI engineering programs emphasizing manufacturing and design.
47. Vocational and technical programs should hire better-qualified teachers with industrial experience to instruct technicians in manufacturing products.
48. UWI should modify its matriculation requirements to insure that incoming students have previous exposure to vocational and technical subjects.
49. Vocational and technical institutions should develop programs that place an emphasis on design and manufacturing.
50. Vocational and technical educational programs should become more innovative, analytic, and efficient in helping students to gear for the labor market.
51. Vocational and technical education should evaluate all programs for effectiveness and terminate ineffective programs.
52. Vocational and technical education should develop a long-term plan for vocational and technical education and training.
53. We have separated the analytic and technical skills by the eleven-plus exam--just when the best students need the skills integrated into a balanced approach.
54. Parents need to understand that their bright offspring needs to acquire vocational and technical education skills even if they qualify for the “prestige” schools.

55. Vocational and technical education administrators should encourage principals of “prestige” schools to introduce vocational and technical subject areas into their school’s curriculum.
56. Vocational and technical education should offer ongoing programs to stay abreast of rapidly changing technology and working methods.
57. Vocational and technical instructors should be retrained in real world problem solving skills and in relevant industry competencies.
58. Vocational and technical education should review existing primary and secondary levels systems, and reform curricula at both levels to focus on learning the basic literacy and mathematics skills in a way that inspires students to be creative in learning.
59. Vocational and technical education should address the issues of unequal access and inferior quality of education—conditions that abound at all levels in Trinidad and Tobago.
60. Vocational and technical education should include basic life skills (conflict resolution, self-awareness and control, family life and sex education) as an integral part of vocational and normative education.
61. Vocational and technical programs should be constructed as an integral part of the total education system not just as a response to problems plaguing the system.
62. Vocational and technical programs should reflect the development needs of the country and meet Government’s developmental goals with a strong focus on IT.
63. Vocational and technical education should incorporate skill training at high-levels especially in computer literacy and information and communication technologies to propel the country forward in its ability to compete globally.

64. High-level skills training--especially in computer literacy and information and communication technologies (as distinct from internet-based technologies and local knowledge)--is necessary to propel the country forward in its ability to compete globally.
65. Basic life skills (conflict resolution, self-awareness and control, family life and sex education) should be an integral part of vocational and normative education.
66. Current heavy academic orientation marginalizes large groups of students.

Appendix E

Q-Sort Protocol

Appendix E1

E-mail to Experts who Completed the Concourse Questionnaire

Date
Name
Title
Address

Dear Dr./Mr./Ms.

Thank you for responding to Part 1 of my survey questionnaire. Your continued participation as a member of the expert panel is essential to the outcome of this study.

The goal of this phase is to determine the importance of the statements provided by participants in part 1 of the survey questionnaire. This phase should take from 30 to 45 minutes for completion. You can access the survey through the hyperlink: http://www.vtdata.org/q_survey/ and mouse clicking the Survey button.

Please complete the survey before March 9th, 2001. Thank you again for your participation, valuable input, and commitment to the educational and economic development effort in Trinidad and Tobago.

Respectfully yours,

Errol Ramsaroop (Researcher)
Virginia Polytechnic Institute and State University
College of Teaching and Learning
119 Wallace Hall (0467)
Blacksburg, VA 24061
(540)231-5471

Appendix E2

E-mail to Experts who did not Respond to the Concourse Questionnaire

Date
Name
Title
Address

Dear Dr./Mr./Ms.

You have been identified as one of a few selected highly qualified individuals among your peers and one who has contributed to Trinidad and Tobago's educational and developmental effort. It would be greatly appreciated if you would participate in a study on the future direction of vocational and technical education (VTE) in Trinidad and Tobago. This survey focuses on VTE's role in the economic development of Trinidad and Tobago.

The statements you are asked to rank-order were provided by a panel of individuals who are involved in defining the need for VTE and economic development or future employable skill training in Trinidad and Tobago. As a citizen of Trinidad and Tobago, I am very sensitive to the needs in this area and as a VTE doctoral student I have the opportunity to conduct research in this area.

The survey should take from 30 to 45 minute to complete. You can access the survey through the hyperlink: http://www.vtdata.org/q_survey/ and mouse clicking the Survey button. The Human Subject file explains your "rights" and conditions under which this survey is conducted.

Please complete the survey before March 9th, 2001. Thank you again for your participation, valuable input and commitment to the educational and economic development effort in Trinidad and Tobago.

Respectfully yours,

Errol Ramsaroop (Researcher)
Virginia Polytechnic Institute and State University
College of Teaching and Learning
119 Wallace Hall (0467)
Blacksburg, VA 24061
(540) 231-5471

Appendix E3

Q-sort Design

Figure 1. Welcome Web Page

The image shows a web page with a light blue background. On the left side, there is a vertical white bar containing a logo (a red circle with a black and white mountain-like shape inside) and three buttons: "Vitae" (blue), "Human Subjects" (blue), and "Survey" (green). The main content area is light blue and contains the following text:

WELCOME

TO THE HOME PAGE OF
ERROL RAMSAROOP

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
College of Human Resources and Education
Department of Teaching and Learning
[E-mail: eramsaro@vt.edu](mailto:eramsaro@vt.edu)

Please feel free to explore this site, however, you are **encourage to take the survey** for a study I am conducting titled "Vocational and Technical Education (VTE) Changes that are Potential Contributors to the Economic Development of Trinidad and Tobago." The results generated from this study have the potential for providing policy makers in Trinidad and Tobago with useful information that can serve as a basis for decision making related to the future development of VTE. It also have the potential to impact VTE programs in the development of workers skills and knowledge necessary for competing in the global economy. Finally, it can be of value to foreign investors who are looking to invest in a country in which the workers possess skills and knowledge for a global economy thus fostering the economic development of the nation.

Please mouse click the "**Survey**" button to take the survey.

Internet Data Collection and Database Design by Geoff Dean © 2001

Figure 2. E-mail Entry Web Page



The image shows a web page for email entry. On the left is a logo consisting of a red circle with a black interior, a white mountain-like shape, and a red ribbon-like element at the bottom. The main content area has a light blue background. It contains the following text: "Please **enter your e-mail address in the text box**. Your e-mail address will become your password." Below this is a white text input field. Underneath the input field is a dark blue button with the word "Continue" in white. At the bottom of the page, there is a red instruction: "If you do not want to continue with this survey, please mouse click on the "Back" or "Home" buttons in the browser menu bar on the top of this page frame."

Please **enter your e-mail address in the text box**. Your e-mail address will become your password.

Continue

If you do not want to continue with this survey, please mouse click on the "Back" or "Home" buttons in the browser menu bar on the top of this page frame.

Figure 3. General Instructions to Participants



Instructions

The purpose of this survey is to collect data regarding what direction Trinidad and Tobago's Vocational and Technical Education (VTE) should take to contribute to the country's economic development in the next 3 to 5 years.

This survey will take approximately 30 minutes to complete. There are a number of selection sequences presented during the administration of the survey. Please carefully read the statements presented and respond to each one in the context of the instructions.

Do not use the "Back" or "Forward" buttons on the web browser frame. Use the blue "Continue" button (see the bottom of this page) on the web pages to advance through the survey.

On some of the survey pages, you will be presented with a list of statements to make your selection. To select any Statement, mouse click on the Statement Number. Selectable statement numbers look similar to this: 24. Once selected you will advance to the next survey page.

Please be patient when completing this survey as it requires you to make detailed judgments about a wide range of possible changes to VTE that may contribute to Trinidad and Tobago's economic development.

Continue

Figure 4. Instructions for Selecting and Identifying the 25 Most Important Statements



4302 1

Instructions

Please provide your view of which of the proposed changes to Vocational and Technical Education (VTE) in Trinidad and Tobago have the potential to improve economic development (for example: high skills/high wage employment reduction in unemployment, increased industrial and service activities, development of global workplaces, etc.) in the next 3 to 5 years. In order to accomplish this task, select and identify the 25 Most Important Statements from the list presented. To identify the statement(s) you selected, mouse click on the statement Number, then read and follow the instructions.

Number	Statement
<u>1</u>	VTE should incorporate analytical skills into their programs.
<u>2</u>	VTE programs should incorporate job-site training as part of the curriculum.
<u>3</u>	VTE programs should recognize the benefits of working together, sharing resources and ideas, and establishing mechanisms for solving common problems.
<u>4</u>	VTE administrators should encourage principals of "prestige" to introduced vocational and technical subject areas into their school curriculum.
<u>5</u>	VTE should incorporate skill training at high-level especially in computer literacy, information and communication technologies to propel the country forward in its ability to compete globally.
<u>6</u>	VTE institutions should include special classes as needed to ensure that their students are both literate and numerate.
<u>7</u>	VTE programs should be updated often to reflect rapid changes in technology and working methods.

Figure 5. Important Statement Selection

 <p>43021</p>	<h3>Question</h3> <p>Do you consider this proposed change to Vocational and Technical Education in Trinidad and Tobago as having the potential to improve economic development (for example: high skills/high wage employment, reduction in unemployment, increased industrial and service activities, developmental of global workplaces, etc.) in the next 3 to 5 years?</p> <p>If Yes, mouse click the Yes button then Continue. If <u>you disagree or changed your opinion</u> mouse click the Continue button.</p> <h3>Selected statement</h3> <p>VTE should incorporate analytical skills into their programs.</p> <p><input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p>Continue</p>
------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Figure 6. Important Statement Verification



43021

Response Verification

Look at the selection below to see if the word "**Important**" appears in the **Importance column**. This indicates that you believe this change to Vocational and Technical Education can contribute to economic development in Trinidad and Tobago in the next 3 to 5 years.

If the word "**Important**" is not visible in the **Importance** column indicates that you believe this change to VTE will not contribute to economic development in Trinidad and Tobago in the next 3 to 5 years.

To proceed with the survey, press the **Continue** button.

Number	Importance	Statement
9	Important	VTE teachers should stay abreast of new technologies in the workplace by continual study and periodic on-site industry visits or work assignments.

Figure 7. Important Statement Selection Status



43021

Your Important Statement Selection Status

Please **select the 25 Most Important Statements** that provide your view of what changes to Vocational and Technical Education have the potential to improve Trinidad and Tobago's economic development (high skills/high wage employment, reduction in unemployment, increased industrial and service sector activities, development of global workplaces) in the next 3 to 5 years.

Mouse click on a single statement **Number** to select that statement.

Selection Status

You have selected **5** of the **25 Most Important** statements.

Number	Importance	Statement
1	Important	VTE should incorporate analytical skills into their programs.
2		VTE programs should incorporate job-site training as part of the curriculum.
3	Important	VTE programs should recognize the benefits of working together, sharing resources and ideas, and establishing mechanisms for solving common problems.
4		VTE administrators should encourage principals of "prestige" to introduced vocational and technical subject areas into their school curriculum.
5	Important	VTE should incorporate skill training at high-level especially in computer literacy, information and communication technologies to propel the country forward in its ability to compete globally.
6		VTE institutions should include special classes as needed to ensure that their students are both literate and numerate.
7	Important	VTE programs should be updated often to reflect rapid changes in technology and working methods.

Figure 8. Instructions for Ranking Selected Important Statements



43021

Importance Statement Ranking

From your selection of the **25 Most Important Statements**, select the 2 most important statements and give them a ranking of **5**. To identify the statement you selected for ranking, mouse click on the statement Number. To rank order the statement select the Rank of 5 button.

From the remaining statements, select the next 3 most important statements and give them a ranking of **4**.

From the remaining statements, select the next 4 most important statements and give them a ranking of **3**.

From the remaining statements, select the next 7 most important statements and give them a ranking of **2**.

Continue

Figure 9. Important Statement Ranking Status



43021

Your Important Statement Ranking Status

From the list of **25** Most Important Statements you selected, select the **2** most important statements and give them a ranking of **5**. To identify the statement you selected for ranking, mouse click on the statement Number. To rank order the statement select the Rank of **5** button.

From the remaining statements, select the next **3** most important statements and give them a ranking of **4**.

From the remaining statements, select the next **4** most important statements and give them a ranking of **3**.

From the remaining statements, select the next **7** most important statements and give them a ranking of **2**.

NOTE: If you see the word *** COMPLETE *** next to any selection, **do not** choose that ranking value. You may choose the next lower or higher ranking value if they are not marked *** COMPLETE ***. When the response distribution is complete, the next section of the instrument will be presented.

If you see the phrase *** Too Many Ranked - Please re-rank your ranked statements *** for that ranking value. Mouse click on any of the statements with that ranking number in the Importance column to re-rank that statement.

Selection Status

You have ranked **0** of the **2** Most Important Statements with a ranking **5**.

You have ranked **0** of the **3** Most Important Statements with a ranking **4**.

You have ranked **0** of the **4** Most Important Statements with a ranking **3**.

You have ranked **0** of the **7** Most Important Statements with a ranking **2**.

Figure 10. Ranking Statement Selection



43021

Question

Please rank the importance of your selected statement with respect to what changes to Vocational and Technical Education have the potential to improve T&T economic development (for example: high skills/high wage employment, reduced unemployment, increased industrial and service sector activities, development of global workplaces, etc.) in the next 3 to 5 years?

Your Selected Statement for Ranking is:

VTE should incorporate analytical skills into their programs.

Rank of 5

Rank of 4

Rank of 3

Rank of 2

[Continue](#)

Figure 11. Important Statement Ranking Verification

Importance Statement Ranking Verification		
Number	Importance	Statement
1	5	VTE should incorporate analytical skills into their programs.

Continue

4302 1

Figure 12. Important Statement Ranking Status



4302 1

Your Important Statement Ranking Status

From the list of **25** Most Important Statements you selected, select the **2** most important statements and give them a ranking of **5**. To identify the statement you selected for ranking, mouse click on the statement Number. To rank order the statement select the Rank of 5 button.

From the remaining statements, select the next **3** most important statements and give them a ranking of **4**.

From the remaining statements, select the next **4** most important statements and give them a ranking of **3**.

From the remaining statements, select the next **7** most important statements and give them a ranking of **2**.

NOTE: If you see the word *** COMPLETE *** next to any selection, **do not** choose that ranking value. You may choose the next lower or higher ranking value if they are not marked *** COMPLETE ***. When the response distribution is complete, the next section of the instrument will be presented.

If you see the phrase *** Too Many Ranked - Please re-rank your ranked statements *** for that ranking value. Mouse click on any of the statements with that ranking number in the Importance column to re-rank that statement.

Selection Status

You have ranked **2** of the **2** Most Important Statements with a ranking **5**. *** COMPLETE ***

You have ranked **4** of the **3** Most Important Statements with a ranking **4**. *** Too Many Ranked - Please re-rank your 4 ranked statements ***

You have ranked **0** of the **4** Most Important Statements with a ranking **3**.

You have ranked **0** of the **7** Most Important Statements with a ranking **2**.

Figure 13. Important Statement Ranking Warning when too Many are Ranked in any Level of Importance



43021

Question

Please rank the importance of your selected statement with respect to what changes to Vocational and Technical Education have the potential to improve T&T economic development (for example: high skills/high wage employment, reduced unemployment, increased industrial and service sector activities, development of global workplaces, etc.) in the next 3 to 5 years?

Your Selected Statement for Ranking is:

UWI should modify its matriculation requirements to insure that incoming students have previous exposure to vocational and technical subjects.

Rank of **5** * **COMPLETE** *

Rank of **4** * **Too Many Ranked - Please re-rank your 4 ranked statements ***

Rank of **3**

Rank of **2**

[Continue](#)

Figure 14. Important Statement Ranking Status with Levels of Importance Completed



Your Important Statement Ranking Status

From the list of **25** Most Important Statements you selected, select the **2** most important statements and give them a ranking of **5**. To identify the statement you selected for ranking, mouse click on the statement Number. To rank order the statement select the Rank of **5** button.

From the remaining statements, select the next **3** most important statements and give them a ranking of **4**.

From the remaining statements, select the next **4** most important statements and give them a ranking of **3**.

From the remaining statements, select the next **7** most important statements and give them a ranking of **2**.

NOTE: If you see the word **+ COMPLETE +** next to any selection, do not choose that ranking value. You may choose the next lower or higher ranking value if they are not marked **+ COMPLETE +**. When the response distribution is complete, the next section of the instrument will be presented.

If you see the phrase *** Too Many Ranked - Please re-rank your ranked statements *** for that ranking value. Mouse click on any of the statements with that ranking number in the importance column to re-rank that statement.

Selection Status

You have ranked **2** of the **2** Most Important Statements with a ranking **5**. **+ COMPLETE +**

You have ranked **3** of the **3** Most Important Statements with a ranking **4**. **+ COMPLETE +**

You have ranked **4** of the **4** Most Important Statements with a ranking **3**. **+ COMPLETE +**

You have ranked **6** of the **7** Most Important Statements with a ranking **2**.

Figure 15. Instructions for Selecting and Identifying 25 Not Important Statements



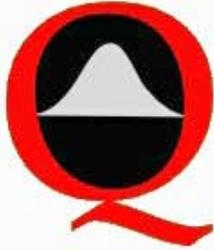
43021

Instructions

Please provide your view of which of the proposed changes to Vocational and Technical Education (VTE) in Trinidad and Tobago have the potential to improve economic development (for example: high skills/high wage employment, reduction in unemployment, increased industrial and service activities, development of global workplaces, etc.) in the next 3 to 5 years. In order to accomplish this task, select and identify the 25 Least Important statements from the list presented. To identify the statement(s) you selected, mouse click on the statement Number, then read and follow the instructions.

Number	Statement
<u>2</u>	VTE programs should incorporate job-site training as part of the curriculum.
<u>4</u>	VTE administrators should encourage principals of "prestige" to introduced vocational and technical subject areas into their school curriculum.
<u>6</u>	VTE institutions should include special classes as needed to ensure that their students are both literate and numerate.
<u>8</u>	VTE should be rooted in the knowledge-based society, from which new technologies grow and ultimately permeate all aspects of commerce.
<u>10</u>	VTE institutions should offer experienced employees an opportunity to obtain the certification needed for career advancement.
<u>12</u>	VTE programs throughout Trinidad and Tobago should be equivalent in scope and design.
<u>14</u>	VTE should be constructed as an integral part of the total education system and not merely as a response to problems and difficulties plaguing the education system.

Figure 16. Not Important Statement Selection



43021

Question

Do you consider this **proposed change** to Vocational and Technical Education in Trinidad and Tobago as **not** having the **potential to improve economic development** (for example: high skills/high wage employment, reduction in unemployment, increased industrial and service activities, developmental of global workplaces, etc.) **in the next 3 to 5 years?**

If **Yes**, mouse click the **Yes** button then **Continue**. If you disagree or changed your opinion mouse click the **Continue** button.

Selected statement

VTE programs should incorporate job-site training as part of the curriculum.

Yes
 No

Continue

Figure 17. Verification of Not Important Statement



43021

Response Verification

Look at the selection below to see if the phrase "**Not Important**" appears in the **Importance column**. This indicates that you **do not** believe this change to Vocational and Technical Education (VTE) can contribute to economic development of Trinidad and Tobago in the next 3 to 5 years.

If the phrase "**Not Important**" is **not visible** in the **Importance column** indicates that you believe this change to VTE can contribute to economic development in Trinidad and Tobago in the next 3 to 5 years.

To proceed with the survey, press the **Continue** button.

Number	Importance	Statement
6	Not Important	VTE institutions should include special classes as needed to ensure that their students are both literate and numerate.

Figure 18. Not Important Statement Selection Status



Your Not Important Statement Selection Status

Please select the **25 Not Important Statements** that provide your view of what changes to VTE do not have the potential to improve Trinidad and Tobago's economic development (high skills/high wage employment, reduction in unemployment, increased industrial and service sector activities, development of global workplaces) in the next 3 to 5 years.

Mouse click on a single Statement **Number** to select that statement.

Selection Status

You have selected **24** of the **25 Not Important** statements.

43021

Number	Importance	Statement
2	Not Important	VTE programs should incorporate job-site training as part of the curriculum.
4		VTE administrators should encourage principals of "prestige" to introduce vocational and technical subject areas into their school curriculum.
6	Not Important	VTE institutions should include special classes as needed to ensure that their students are both literate and numerate.
8		VTE should be rooted in the knowledge-based society, from which new technologies grow and ultimately permeate all aspects of commerce.
10	Not Important	VTE institutions should offer experienced employees an opportunity to obtain the certification needed for career advancement.
12		VTE programs throughout Trinidad and Tobago should be equivalent in scope and design.
14	Not Important	VTE should be constructed as an integral part of the total education system and not merely as a response to problems and difficulties plaguing the education system.

Figure 19. Instructions for Ranking Selected Not Important Statements



43001

Not Important Statement Ranking

From your selected list of the **25** Least Important statements for changes to Vocational and Technical Education that may potentially improve economic development in Trinidad and Tobago in the next 3 to 5 years.

Select the **2** Least Important statements and give a ranking of **-5**. To make your selection, mouse click on the statement Number then select the Rating of **-5** button. The word **"COMPLETE"** will appear when you have selected both statements.

From the remaining statements, select the next **3** Least Important statements and give these a ranking of **-4**. To make your selection, mouse click on the statement Number then select the Rating of **-4** button. The word **"COMPLETE"** will appear when you have selected these 3 statements.

From the remaining statements, select the next **4** Least Important statements and give these a ranking of **-3**. To make your selection, mouse click on the statement Number then select the Rating of **-3** button. The word **"COMPLETE"** will appear when you have selected these 4 statements.

From the remaining statements select the next **7** Least Important statements and give these statements a ranking of **-2**. To make your selection, mouse click on the statement Number then select the Rating of **-2** button. The word **"COMPLETE"** will appear when you have selected these 7 statements.

Continue

Figure 20. Ranking Selection for Not Important Statements



43021

Question

Please rank the importance of your selected statement with respect to what changes to Vocational and Technical Education have the potential to improve T&T economic development (for example: high skills/high wage employment, reduced unemployment, increased industrial and service sector activities, development of global workplaces, etc.) in the next 3 to 5 years?

Your Selected Statement for Ranking is:

VTE programs should incorporate job-site training as part of the curriculum.

Rank of -5

Rank of -4

Rank of -3

Rank of -2

[Continue](#)

Figure 21. Not Important Statement Ranking Status



43021

Your Not Important Statement Ranking Status

From the list of **25** Least Important Statements you selected, select the **2** Least Important statements and give them a ranking of **-5**. To identify the statement you selected for ranking, mouse click on the statement Number. To rank order the statement select the Rank of **-5** button.

From the remaining statements, select the next **3** least important statements and give them a ranking of **-4**.

From the remaining statements, select the next **4** least important statements and give them a ranking of **-3**.

From the remaining statements, select the next **7** least important statements and give them a ranking of **-2**.

NOTE: If you see the word *** COMPLETE *** next to any selection, **do not** choose that ranking value. You may choose the next lower or higher ranking value if they are not marked *** COMPLETE ***. When the response distribution is complete, the next section of the instrument will be presented.

If you see the phrase *** Too Many Ranked - Please re-rank your ranked statements *** for that ranking value. Mouse click on any of the statements with that ranking number in the **Importance** column to re-rank that statement.

Selection Status

You have ranked **2** of the **2** Least Important Statements with a ranking **-5**. *** COMPLETE ***

You have ranked **3** of the **3** Least Important Statements with a ranking **-4**. *** COMPLETE ***

You have ranked **4** of the **4** Least Important Statements with a ranking **-3**. *** COMPLETE ***

You have ranked **6** of the **7** Least Important Statements with a ranking **-2**.

Figure 22. Thank you Web Page



Appendix F

Random Ordered Edited Respondent Statements Used in the Q-sort

Appendix F

Random Ordered Edited Respondent Statements Used in the Q-sort

1. VTE should incorporate analytical skills into their programs.
2. VTE programs should incorporate job-site training as part of the curriculum.
3. VTE programs should recognize the benefits of working together, sharing resources and ideas, and establishing mechanisms for solving common problems.
4. VTE administrators should encourage principals of "prestige" schools to introduced vocational and technical subject areas into their school curriculum.
5. VTE should incorporate skill training at high-level especially in computer literacy, information and communication technologies to propel the country forward in its ability to compete globally.
6. VTE institutions should include special classes as needed to insure that their students are both literate and numerate.
7. VTE programs should be updated often to reflect rapid changes in technology and working methods.
8. VTE should be rooted in the knowledge-based society, from which new technologies grow and ultimately permeate all aspects of commerce.
9. VTE teachers should stay abreast of new technologies in the workplace by continual study and periodic on-site industry visits or work assignments.
10. VTE institutions should offer experienced employees an opportunity to obtain the certification needed for career advancement.
11. VTE should provide the flexibility for students to pursue both academic and VTE simultaneously or to move between both streams with ease.
12. VTE programs throughout Trinidad and Tobago should be equivalent in scope and design.
13. VTE should be properly aligned at the primary and secondary levels as an integral part of the total education system.
14. VTE should be constructed as an integral part of the total education system and not merely as a response to problems and difficulties plaguing the education system.

15. VTE institutions should require programs to network and/or work closely with organizations to introduce students to the workplace and world of work.
16. All public VTE organizations should reevaluate, justify, and clarify their roles and objectives.
17. VTE institutions should establish a system of accrediting VTE programs and insure that institutions modify their structures accordingly.
18. VTE institutions should strengthen their linkage to the industrial sector.
19. VTE institutions should correct the current misperception that vocational and technical program is for underachievers.
20. VTE should hire better-qualified teachers with industrial experience to instruct technicians in manufacturing products.
21. VTE should review existing primary and secondary levels systems, and reforming curricula at both levels to focus on learning the basic literacy and mathematics skills in a way that inspires students to be creative in learning.
22. VTE should link their programs to Trinidad and Tobago's business structure allowing graduates to move into management in order to earn higher remuneration.
23. VTE should realistically evaluate secondary school curricula, insuring effective school-to-work transitions.
24. VTE institutions should develop programs that place an emphasis on design and manufacturing.
25. UWI should modify its matriculation requirements to insure that incoming students have previous exposure to vocational and technical subjects.
26. VTE institutions should develop a unified organization to deal with and solve problems related to at-risk youth.
27. VTE should offer ongoing programs to stay abreast of rapidly changing technology and working methods.
28. VTE programs should delay introduction of VTE until the final years of high school or the first year of post-secondary school.
29. VTE studies should develop regional councils to insure that VTE studies adapt to regional demands.

30. VTE should be more widely offered in Trinidad and Tobago.
31. VTE should engage the local business leaders in determining their needs and anchoring program plans in the local needs of industry and commerce.
32. VTE should evaluate all programs for effectiveness and terminate ineffective programs.
33. Government VTE institutions should recognize the private-sector's role in vocational and technical education--namely, providing incentives to facilitate skills development in the workplace.
34. VTE institutions should better manage education resources--plant, machinery, and consumables--to insure meaningful training and increased government allocations.
35. VTE programs should reflect the development needs of the country and meet Government's developmental goals with a strong focus in IT.
36. All VTE providers should come together and develop a unified plan to reorganize VTE studies and discuss it nationally.
37. VTE administrators should educate students, parents, and communities on the advantages of vocational and technical training.
38. VTE should address the issues of unequal access and inferior quality of education--conditions that abound at all levels in Trinidad and Tobago.
39. VTE should increase the number of students enrolled in its programs.
40. VTE programs should insure that their program quality measures are relevant to the workplace.
41. VTE should be incorporated into subject areas taught at prestige school.
42. VTE programs should incorporate management training as part of their student technical educational skills.
43. VTE should acknowledge that creating employment is the reason for providing this form of education.
44. VTE traditional subjects at lower grades should gradually incorporate technician-level courses such as information technology, telecommunications, electronics, and biotechnology.

45. VTE should produce a cadre of engineers capable of working in Product Design and Manufacturing.
46. VTE programs should become more innovative, analytic, and efficient in helping students to gear for the labor market.
47. VTE programs should insure that their program quality measures meet international standards.
48. VTE should develop a national system of articulation with higher level of education within Trinidad and Tobago educational system.
49. VTE administrators should work closely with employers to motivate employees to continue upgrading their vocational skills.
50. VTE should produce graduates who can demonstrate to society that their studies lead to successful careers.
51. VTE should insure high quality-standards at all levels of skill development.
52. VTE should improve guidance and counseling services for preparing students to select and pursue meaningful careers
53. VTE articulation should provide a smooth transition and clear path from technical school to a university-level degree.
54. VTE institutions should negotiate with top-level industry leaders in order to secure work opportunities for trainees/graduates of programs.
55. VTE courses should be added to UWI engineering programs emphasizing manufacturing and design.
56. VTE should be integrated with mainstream academics in the earlier school years, thus exposing younger students to a broader range of specialties from which to choose.
57. VTE instructors should be retrained in real world problem solving skills and in relevant industry competencies.
58. VTE administrators should encourage companies to recognize and reward successful programs and competent graduates and administrators of outstanding technical institutes.
59. VTE should include basic life skills (conflict resolution, self-awareness and control, family life and sex education) as an integral part of vocational and normative education.

60. VTE should develop a long-term plan for vocational and technical education and training.

Appendix G

Normalized Factor Scores For Factors 1 - 8

Appendix G1

Normalized Factor Scores for Factor 1 (Access to and quality of VTE)

Stat. No.	Statements	Z-Score
57	VTE instructors should be retrained in real world problem so . . .	2.209
07	VTE programs should be updated often to reflect rapid change . . .	1.729
38	VTE should address the issues of unequal access and inferior . . .	1.729
56	VTE should be integrated with mainstream academics in the ea . . .	1.629
33	Government VTE institutions should recognize the private-sec . . .	1.528
52	VTE should improve guidance and counseling services for prep . . .	1.450
9	VTE teachers should stay abreast of new technologies in the . . .	1.439
35	VTE programs should reflect the development needs of the cou . . .	1.350
27	VTE should offer ongoing programs to stay abreast of rapidly . . .	1.149
23	VTE should realistically evaluate secondary school curricula . . .	1.060
31	VTE should engage the local business leaders in determining . . .	.770
21	VTE should review existing primary and secondary levels sys . . .	.669
11	VTE should provide the flexibility for students to pursue bo . . .	.669
3	VTE programs should recognize the benefits of working togeth . .	.669
48	VTE should develop a national system of articulation with hi . . .	.580
51	VTE should insure high quality-standards at all levels of skill . . .	.580
14	VTE should be constructed as an integral part of the total ed . . .	.491
28	VTE programs should delay introduction of VTE until the fina . . .	.480
17	VTE institutions should establish a system of accrediting VTE . . .	.468
36	All VTE providers should come together and develop a unified . . .	.391
29	VTE studies should develop regional councils to insure that VTE . . .	.379
40	VTE programs should insure that their program quality measur . . .	.379
50	VTE should produce graduates who can demonstrate to society . . .	.379
6	VTE institutions should include special classes as needed to . . .	.290
10	VTE institutions should offer experienced employees an oppor . . .	.201
2	VTE programs should incorporate job-site training as part of . . .	.190
43	VTE should acknowledge that creating employment is the reaso . . .	.190
18	VTE institutions should strengthen their linkage to the industrial . . .	.100
5	VTE should incorporate skill training at high-level especially in . . .	.078
8	VTE should be rooted in the knowledge-based society, from . . .	.000
20	VTE should hire better-qualified teachers with industrial exp . . .	.000
16	All public VTE organizations should reevaluate, justify, and . . .	.000
44	VTE traditional subjects at lower grades should gradually inc . . .	-.089
53	VTE articulation should provide a smooth transition and cle . . .	-.089
39	VTE should increase the number of students enrolled in its . . .	-.100
46	VTE programs should become more innovative, analytic, and . . .	-.190
54	VTE institutions should negotiate with top-level industry lead . . .	-.201
41	VTE should be incorporate into subject areas taught at prestige . . .	-.379
34	VTE institutions should better manage education resources—pl . . .	-.290

37	VTE administrators should educate students, parents, and com . . .	-.290
47	VTE programs should insure that their program quality meas . . .	-.391
12	VTE programs throughout Trinidad and Tobago should be eq . . .	-.480
32	VTE should evaluate all programs for effectiveness and termina . . .	-.480
1	VTE should incorporate analytical skills into their programs	-.480
60	VTE should develop a long-term plan for vocational and tech . . .	-.569
30	VTE should be more widely offered in Trinidad and Tobago	-.669
15	VTE institutions should require programs to network and/or . . .	-.681
49	VTE administrators should work closely with employers to . . .	-.770
42	VTE programs should incorporate management training as part . . .	-.770
13	VTE should be properly aligned at the primary and secondary . . .	-.870
26	VTE institutions should develop a unified organization to deal . . .	-.959
24	VTE institutions should develop programs that place an emph . . .	-1.048
58	VTE administers should encourage companies to recognize . . .	-1.149
19	VTE institutions should correct the current misperception that . . .	-1.249
22	VTE should link their programs to Trinidad and Tobago's bus . . .	-1.350
55	VTE courses should be added to UWI engineering programs em . . .	-1.528
45	VTE should produce a cadre of engineers capable of working in . . .	-1.729
4	VTE administrators should encourage principals of "prestige" to . . .	-2.108
59	VTE should include basic life skills (conflict resolution, self-aw . . .	-2.209
25	UWI should modify its matriculation requirements to insure that . . .	-2.209

Appendix G2

Normalized Factor Score for Factor 2 (VTE higher education programs)

Stat. No.	Statements	Z-Score
13	VTE should be properly aligned at the primary and secondary . . .	2.077
45	VTE should produce a cadre of engineers capable of working in . . .	2.077
14	VTE should be constructed as an integral part of the total ed . . .	1.661
21	VTE should review existing primary and secondary levels sys . . .	1.661
55	VTE courses should be added to UWI engineering programs em . . .	1.661
4	VTE administrators should encourage principals of "prestige" to . . .	1.246
8	VTE should be rooted in the knowledge-based society, from . . .	1.246
25	UWI should modify its matriculation requirements to insure that . . .	1.246
41	VTE should be incorporate into subject areas taught at prestige . . .	1.246
16	All public VTE organizations should reevaluate, justify, and . . .	.831
19	VTE institutions should correct the current misperception that . . .	.831
20	VTE should hire better-qualified teachers with industrial exp . . .	.831
24	VTE institutions should develop programs that place an emph . . .	.831
34	VTE institutions should better manage education resources—pl . . .	.831
37	VTE administrators should educate students, parents, and com . . .	.831
60	VTE should develop a long-term plan for vocational and tech . . .	.831
2	VTE programs should incorporate job-site training as part of . . .	.415
6	VTE institutions should include special classes as needed to . . .	.415
10	VTE institutions should offer experienced employees an oppor . . .	.415
11	VTE should provide the flexibility for students to pursue bo . . .	.415
36	All VTE providers should come together and develop a unified . . .	.415
40	VTE programs should insure that their program quality measur . . .	.415
53	VTE articulation should provide a smooth transition and cle . . .	.415
56	VTE should be integrated with mainstream academics in the ea . . .	.415
57	VTE instructors should be retrained in real world problem so . . .	.415
7	VTE programs should be updated often to reflect rapid change . . .	.000
12	VTE programs throughout Trinidad and Tobago should be eq . . .	.000
15	VTE institutions should require programs to network and/or . . .	.000
28	VTE programs should delay introduction of VTE until the fina . . .	.000
29	VTE studies should develop regional councils to insure that VTE . . .	.000
30	VTE should be more widely offered in Trinidad and Tobago	.000
32	VTE should evaluate all programs for effectiveness and termina . . .	.000
35	VTE programs should reflect the development needs of the cou . . .	.000
38	VTE should address the issues of unequal access and inferior . . .	.000
39	VTE should increase the number of students enrolled in its . . .	.000
1	VTE should incorporate analytical skills into their programs	-.415
3	VTE programs should recognize the benefits of working togeth . . .	-.415
9	VTE teachers should stay abreast of new technologies in the . . .	-.415
31	VTE should engage the local business leaders in determining . . .	-.415

42	VTE programs should incorporate management training as part . . .	-.415
43	VTE should acknowledge that creating employment is the reaso . . .	-.415
46	VTE programs should become more innovative, analytic, and . . .	-.415
47	VTE programs should insure that their program quality meas . . .	-.415
50	VTE should produce graduates who can demonstrate to society . . .	-.415
5	VTE should incorporate skill training at high-level especially in . . .	-.831
17	VTE institutions should establish a system of accrediting VTE . . .	-.831
44	VTE traditional subjects at lower grades should gradually inc . . .	-.831
48	VTE should develop a national system of articulation with hi . . .	-.831
51	VTE should insure high quality-standards at all levels of skill . . .	-.831
52	VTE should improve guidance and counseling services for prep . . .	-.831
54	VTE institutions should negotiate with top-level industry lead . . .	-.831
18	VTE institutions should strengthen their linkage to the industrial . . .	-1.246
22	VTE should link their programs to Trinidad and Tobago's bus . . .	-1.246
23	VTE should realistically evaluate secondary school curricula . . .	-1.246
26	VTE institutions should develop a unified organization to deal . . .	-1.246
33	Government VTE institutions should recognize the private-sec . . .	-1.661
59	VTE should include basic life skills (conflict resolution, self-aw . . .	-1.661
27	VTE should offer ongoing programs to stay abreast of rapidly . . .	-1.661
49	VTE administrators should work closely with employers to . . .	-2.077
58	VTE administers should encourage companies to recognize . . .	-2.077

Appendix G3

Normalized Factor Score for Factor 3 (VTE program quality)

Item No.	Statements	Z-Score
7	VTE programs should be updated often to reflect rapid change . . .	1.979
35	VTE programs should reflect the development needs of the cou . . .	1.782
18	VTE institutions should strengthen their linkage to the industrial . . .	1.695
9	VTE teachers should stay abreast of new technologies in the . . .	1.609
51	VTE should insure high quality-standards at all levels of skill . . .	1.498
2	VTE programs should incorporate job-site training as part of . . .	1.323
19	VTE institutions should correct the current misperception that . . .	1.323
40	VTE programs should insure that their program quality measur . . .	1.312
47	VTE programs should insure that their program quality meas . . .	1.225
30	VTE should be more widely offered in Trinidad and Tobago	1.126
10	VTE institutions should offer experienced employees an oppor . . .	1.039
1	VTE should incorporate analytical skills into their programs	.940
4	VTE administrators should encourage principals of "prestige" to . . .	.842
46	VTE programs should become more innovative, analytic, and . . .	.743
6	VTE institutions should include special classes as needed to . . .	.667
52	VTE should improve guidance and counseling services for prep . . .	.656
57	VTE instructors should be retrained in real world problem so . . .	.656
60	VTE should develop a long-term plan for vocational and tech . . .	.656
11	VTE should provide the flexibility for students to pursue bo . . .	.470
14	VTE should be constructed as an integral part of the total ed . . .	.459
16	All public VTE organizations should reevaluate, justify, and . . .	.383
23	VTE should realistically evaluate secondary school curricula . . .	.383
27	VTE should offer ongoing programs to stay abreast of rapidly . . .	.383
37	VTE administrators should educate students, parents, and com . . .	.372
15	VTE institutions should require programs to network and/or . . .	.186
17	VTE institutions should establish a system of accrediting VTE . . .	.186
31	VTE should engage the local business leaders in determining . . .	.099
29	VTE studies should develop regional councils to insure that VTE . . .	.087
8	VTE should be rooted in the knowledge-based society, from . . .	.000
33	Government VTE institutions should recognize the private-sec . . .	.000
34	VTE institutions should better manage education resources—pl . . .	.000
39	VTE should increase the number of students enrolled in its . . .	-.087
53	VTE articulation should provide a smooth transition and cle . . .	-.087
54	VTE institutions should negotiate with top-level industry lead . . .	-.087
20	VTE should hire better-qualified teachers with industrial exp . . .	-.099
48	VTE should develop a national system of articulation with hi . . .	-.186
13	VTE should be properly aligned at the primary and secondary . . .	-.284
32	VTE should evaluate all programs for effectiveness and termina . . .	-.284
43	VTE should acknowledge that creating employment is the reaso . . .	-.284

49	VTE administrators should work closely with employers to . . .	-.284
50	VTE should produce graduates who can demonstrate to society . . .	-.284
5	VTE should incorporate skill training at high-level especially in . . .	-.372
26	VTE institutions should develop a unified organization to deal . . .	-.372
56	VTE should be integrated with mainstream academics in the ea . . .	-.383
42	VTE programs should incorporate management training as part . . .	-.754
44	VTE traditional subjects at lower grades should gradually inc . . .	-.754
25	UWI should modify its matriculation requirements to insure that . . .	-.842
36	All VTE providers should come together and develop a unified . . .	-1.039
55	VTE courses should be added to UWI engineering programs em . . .	-1.126
22	VTE should link their programs to Trinidad and Tobago's bus . . .	-1.137
28	VTE programs should delay introduction of VTE until the fina . . .	-1.312
58	VTE administers should encourage companies to recognize . . .	-1.312
45	VTE should produce a cadre of engineers capable of working in . . .	-1.410
3	VTE programs should recognize the benefits of working togeth . .	-1.422
59	VTE should include basic life skills (conflict resolution, self-aw . . .	-1.498
21	VTE should review existing primary and secondary levels sys . . .	-1.509
41	VTE should be incorporate into subject areas taught at prestige . . .	-1.596
24	VTE institutions should develop programs that place an emph . . .	-1.695
38	VTE should address the issues of unequal access and inferior . . .	-1.782
12	VTE programs throughout Trinidad and Tobago should be eq . . .	-1.793

Appendix G4

Normalized Factor Score for Factor 4 (VTE program comprehensiveness)

Item No.	Statements	Z-Score
51	VTE should insure high quality-standards at all levels of skill . . .	2.077
56	VTE should be integrated with mainstream academics in the ea . . .	2.077
5	VTE should incorporate skill training at high-level especially in . . .	1.661
14	VTE should be constructed as an integral part of the total ed . . .	1.661
37	VTE administrators should educate students, parents, and com . . .	1.661
7	VTE programs should be updated often to reflect rapid change . . .	1.246
17	VTE institutions should establish a system of accrediting VTE . . .	1.246
24	VTE institutions should develop programs that place an emph . . .	1.246
35	VTE programs should reflect the development needs of the cou . . .	1.246
3	VTE programs should recognize the benefits of working togeth . .	.831
9	VTE teachers should stay abreast of new technologies in the . . .	.831
11	VTE should provide the flexibility for students to pursue bo . . .	.831
27	VTE should offer ongoing programs to stay abreast of rapidly . . .	.831
30	VTE should be more widely offered in Trinidad and Tobago	.831
39	VTE should increase the number of students enrolled in its . . .	.831
52	VTE should improve guidance and counseling services for prep . . .	.831
2	VTE programs should incorporate job-site training as part of . . .	.415
12	VTE programs throughout Trinidad and Tobago should be eq . . .	.415
15	VTE institutions should require programs to network and/or . . .	.415
20	VTE should hire better-qualified teachers with industrial exp . . .	.415
21	VTE should review existing primary and secondary levels sys . . .	.415
36	All VTE providers should come together and develop a unified . . .	.415
43	VTE should acknowledge that creating employment is the reaso . . .	.415
53	VTE articulation should provide a smooth transition and cle . . .	.415
57	VTE instructors should be retrained in real world problem so . . .	.415
18	VTE institutions should strengthen their linkage to the industrial . . .	.000
28	VTE programs should delay introduction of VTE until the fina . . .	.000
32	VTE should evaluate all programs for effectiveness and termina . . .	.000
40	VTE programs should insure that their program quality measur . . .	.000
42	VTE programs should incorporate management training as part . . .	.000
46	VTE programs should become more innovative, analytic, and . . .	.000
49	VTE administrators should work closely with employers to . . .	.000
50	VTE should produce graduates who can demonstrate to society . . .	.000
55	VTE courses should be added to UWI engineering programs em . . .	.000
59	VTE should include basic life skills (conflict resolution, self-aw . . .	.000
1	VTE should incorporate analytical skills into their programs	-.415
6	VTE institutions should include special classes as needed to . . .	-.415
10	VTE institutions should offer experienced employees an oppor . . .	-.415
13	VTE should be properly aligned at the primary and secondary . . .	-.415

23	VTE should realistically evaluate secondary school curricula . . .	-415
29	VTE studies should develop regional councils to insure that VTE . . .	-415
44	VTE traditional subjects at lower grades should gradually inc . . .	-415
45	VTE should produce a cadre of engineers capable of working in . . .	-415
48	VTE should develop a national system of articulation with hi . . .	-415
4	VTE administrators should encourage principals of "prestige" to . . .	-831
19	VTE institutions should correct the current misperception that . . .	-831
22	VTE should link their programs to Trinidad and Tobago's bus . . .	-831
31	VTE should engage the local business leaders in determining . . .	-831
34	VTE institutions should better manage education resources—pl . . .	-831
41	VTE should be incorporate into subject areas taught at prestige . . .	-831
54	VTE institutions should negotiate with top-level industry lead . . .	-831
8	VTE should be rooted in the knowledge-based society, from . . .	-1.246
38	VTE should address the issues of unequal access and inferior . . .	-1.246
58	VTE administers should encourage companies to recognize . . .	-1.246
60	VTE should develop a long-term plan for vocational and tech . . .	-1.246
16	All public VTE organizations should reevaluate, justify, and . . .	-1.661
26	VTE institutions should develop a unified organization to deal . . .	-1.661
33	Government VTE institutions should recognize the private-sec . . .	-1.661
25	UWI should modify its matriculation requirements to insure that . . .	-2.077
47	VTE programs should insure that their program quality meas . . .	-2.077

Appendix G5

Normalized Factor Score Factor 5 (Fundamental aspects of VTE)

Item No.	Statements	Z-Score
08	VTE should be rooted in the knowledge-based society, from . . .	2.211
59	VTE should include basic life skills (conflict resolution, self-aw . . .	1.838
2	VTE programs should incorporate job-site training as part of . . .	1.495
5	VTE should incorporate skill training at high-level especially in . . .	1.401
27	VTE should offer ongoing programs to stay abreast of rapidly . . .	1.401
51	VTE should insure high quality-standards at all levels of skill . . .	1.371
9	VTE teachers should stay abreast of new technologies in the . . .	1.307
53	VTE articulation should provide a smooth transition and cle . . .	1.182
46	VTE programs should become more innovative, analytic, and . . .	1.153
60	VTE should develop a long-term plan for vocational and tech . . .	1.028
7	VTE programs should be updated often to reflect rapid change . . .	.934
10	VTE institutions should offer experienced employees an oppor . . .	.934
40	VTE programs should insure that their program quality measur . . .	.934
31	VTE should engage the local business leaders in determining . . .	.874
57	VTE instructors should be retrained in real world problem so . . .	.840
18	VTE institutions should strengthen their linkage to the industrial . . .	.810
48	VTE should develop a national system of articulation with hi . . .	.686
35	VTE programs should reflect the development needs of the cou . . .	.621
36	All VTE providers should come together and develop a unified . . .	.591
12	VTE programs throughout Trinidad and Tobago should be eq . . .	.467
50	VTE should produce graduates who can demonstrate to society . . .	.343
14	VTE should be constructed as an integral part of the total ed . . .	.248
17	VTE institutions should establish a system of accrediting VTE . . .	.219
32	VTE should evaluate all programs for effectiveness and termina . . .	.219
1	VTE should incorporate analytical skills into their programs	.094
15	VTE institutions should require programs to network and/or . . .	.094
16	All public VTE organizations should reevaluate, justify, and . . .	.094
11	VTE should provide the flexibility for students to pursue bo . . .	.030
3	VTE programs should recognize the benefits of working togeth . . .	.000
20	VTE should hire better-qualified teachers with industrial exp . . .	.000
30	VTE should be more widely offered in Trinidad and Tobago	.000
52	VTE should improve guidance and counseling services for prep . . .	-.094
13	VTE should be properly aligned at the primary and secondary . . .	-.124
39	VTE should increase the number of students enrolled in its . . .	-.124
42	VTE programs should incorporate management training as part . . .	-.124
23	VTE should realistically evaluate secondary school curricula . . .	-.219
56	VTE should be integrated with mainstream academics in the ea . . .	-.219
22	VTE should link their programs to Trinidad and Tobago's bus . . .	-.313
34	VTE institutions should better manage education resources—pl . . .	-.343

6	VTE institutions should include special classes as needed to . . .	-.373
21	VTE should review existing primary and secondary levels sys . . .	-.467
24	VTE institutions should develop programs that place an emph . . .	-.467
47	VTE programs should insure that their program quality meas . . .	-.497
33	Government VTE institutions should recognize the private-sec . . .	-.561
38	VTE should address the issues of unequal access and inferior . . .	-.561
49	VTE administrators should work closely with employers to . . .	-.591
54	VTE institutions should negotiate with top-level industry lead . . .	-.591
43	VTE should acknowledge that creating employment is the reaso . . .	-.686
55	VTE courses should be added to UWI engineering programs em . . .	-.686
29	VTE studies should develop regional councils to insure that VTE . . .	-.780
26	VTE institutions should develop a unified organization to deal . . .	-.810
37	VTE administrators should educate students, parents, and com . . .	-1.058
45	VTE should produce a cadre of engineers capable of working in . . .	-1.153
44	VTE traditional subjects at lower grades should gradually inc . . .	-1.277
58	VTE administers should encourage companies to recognize . . .	-1.401
28	VTE programs should delay introduction of VTE until the fina . . .	-1.620
41	VTE should be incorporate into subject areas taught at prestige . . .	-1.744
25	UWI should modify its matriculation requirements to insure that . . .	-1.992
19	VTE institutions should correct the current misperception that . . .	-2.211
4	VTE administrators should encourage principals of "prestige" to . . .	-2.335

Appendix G6

Normalized Factor Score Factor 6 (Preparation for and advancement in VTE careers)

Item No.	Statements	Z-Score
5	VTE should incorporate skill training at high-level especially in . . .	2.077
9	VTE teachers should stay abreast of new technologies in the . . .	2.077
12	VTE programs throughout Trinidad and Tobago should be eq . . .	1.661
15	VTE institutions should require programs to network and/or . . .	1.661
20	VTE should hire better-qualified teachers with industrial exp . . .	1.661
17	VTE institutions should establish a system of accrediting VTE . . .	1.246
19	VTE institutions should correct the current misperception that . . .	1.246
30	VTE should be more widely offered in Trinidad and Tobago	1.246
40	VTE programs should insure that their program quality measur . . .	1.246
2	VTE programs should incorporate job-site training as part of . . .	.831
6	VTE institutions should include special classes as needed to . . .	.831
21	VTE should review existing primary and secondary levels sys . . .	.831
23	VTE should realistically evaluate secondary school curricula . . .	.831
27	VTE should offer ongoing programs to stay abreast of rapidly . . .	.831
33	Government VTE institutions should recognize the private-sec . . .	.831
53	VTE articulation should provide a smooth transition and cle . . .	.831
58	VTE administrators should encourage companies to recognize . . .	.831
60	VTE should develop a long-term plan for vocational and tech . . .	.831
3	VTE programs should recognize the benefits of working togeth . .	.415
7	VTE programs should be updated often to reflect rapid change . . .	.415
8	VTE should be rooted in the knowledge-based society, from . . .	.415
13	VTE should be properly aligned at the primary and secondary . . .	.415
18	VTE institutions should strengthen their linkage to the industrial . . .	.415
22	VTE should link their programs to Trinidad and Tobago's bus . . .	.415
31	VTE should engage the local business leaders in determining . . .	.415
32	VTE should evaluate all programs for effectiveness and termina . . .	.415
54	VTE institutions should negotiate with top-level industry lead . . .	.415
1	VTE should incorporate analytical skills into their programs	.000
35	VTE programs should reflect the development needs of the cou . . .	.000
39	VTE should increase the number of students enrolled in its . . .	.000
44	VTE traditional subjects at lower grades should gradually inc . . .	.000
46	VTE programs should become more innovative, analytic, and . . .	.000
47	VTE programs should insure that their program quality meas . . .	.000
48	VTE should develop a national system of articulation with hi . . .	.000
49	VTE administrators should work closely with employers to . . .	.000
51	VTE should insure high quality-standards at all levels of skill . . .	.000
52	VTE should improve guidance and counseling services for prep . . .	.000
11	VTE should provide the flexibility for students to pursue bo . . .	-.415
14	VTE should be constructed as an integral part of the total ed . . .	-.415

16	All public VTE organizations should reevaluate, justify, and . . .	-415
28	VTE programs should delay introduction of VTE until the fina . . .	-415
29	VTE studies should develop regional councils to insure that VTE . . .	-415
36	All VTE providers should come together and develop a unified . . .	-415
37	VTE administrators should educate students, parents, and com . . .	-415
43	VTE should acknowledge that creating employment is the reaso . . .	-415
50	VTE should produce graduates who can demonstrate to society . . .	-415
34	VTE institutions should better manage education resources—pl . . .	-831
38	VTE should address the issues of unequal access and inferior . . .	-831
56	VTE should be integrated with mainstream academics in the ea . . .	-831
57	VTE instructors should be retrained in real world problem so . . .	-831
59	VTE should include basic life skills (conflict resolution, self-aw . . .	-831
41	VTE should be incorporate into subject areas taught at prestige . . .	-1.246
42	VTE programs should incorporate management training as part . . .	-1.246
45	VTE should produce a cadre of engineers capable of working in . . .	-1.246
55	VTE courses should be added to UWI engineering programs em . . .	-1.246
24	VTE institutions should develop programs that place an emph . . .	-1.661
25	UWI should modify its matriculation requirements to insure that . . .	-1.661
26	VTE institutions should develop a unified organization to deal . . .	-1.661
4	VTE administrators should encourage principals of "prestige" to . . .	-2.077
10	VTE institutions should offer experienced employees an oppor . . .	-2.077

Appendix G7

Normalized Factor Score Factor 7 (Meeting VTE students and program needs)

Item No.	Statement	Z-Score
13	VTE should be properly aligned at the primary and secondary . . .	2.077
14	VTE should be constructed as an integral part of the total ed . . .	2.077
30	VTE should be more widely offered in Trinidad and Tobago	2.077
39	VTE should increase the number of students enrolled in its . . .	2.077
21	VTE should review existing primary and secondary levels sys . . .	1.661
26	VTE institutions should develop a unified organization to deal . . .	1.661
56	VTE should be integrated with mainstream academics in the ea . . .	1.661
1	VTE should incorporate analytical skills into their programs	1.246
11	VTE should provide the flexibility for students to pursue bo . . .	1.246
46	VTE programs should become more innovative, analytic, and . . .	1.246
57	VTE instructors should be retrained in real world problem so . . .	1.246
7	VTE programs should be updated often to reflect rapid change . . .	.831
8	VTE should be rooted in the knowledge-based society, from . . .	.831
9	VTE teachers should stay abreast of new technologies in the . . .	.831
41	VTE should be incorporate into subject areas taught at prestige . . .	.831
53	VTE articulation should provide a smooth transition and cle . . .	.831
59	VTE should include basic life skills (conflict resolution, self-aw . . .	.831
60	VTE should develop a long-term plan for vocational and tech . . .	.831
2	VTE programs should incorporate job-site training as part of . . .	.415
5	VTE should incorporate skill training at high-level especially in . . .	.415
6	VTE institutions should include special classes as needed to . . .	.415
24	VTE institutions should develop programs that place an emph . . .	.415
38	VTE should address the issues of unequal access and inferior . . .	.415
43	VTE should acknowledge that creating employment is the reaso . . .	.415
51	VTE should insure high quality-standards at all levels of skill . . .	.415
52	VTE should improve guidance and counseling services for prep . . .	.415
54	VTE institutions should negotiate with top-level industry lead . . .	.415
4	VTE administrators should encourage principals of "prestige" to . . .	.000
18	VTE institutions should strengthen their linkage to the industrial . . .	.000
20	VTE should hire better-qualified teachers with industrial exp . . .	.000
22	VTE should link their programs to Trinidad and Tobago's bus . . .	.000
35	VTE programs should reflect the development needs of the cou . . .	.000
40	VTE programs should insure that their program quality measur . . .	.000
44	VTE traditional subjects at lower grades should gradually inc . . .	.000
47	VTE programs should insure that their program quality meas . . .	.000
50	VTE should produce graduates who can demonstrate to society . . .	.000
58	VTE administers should encourage companies to recognize . . .	.000
23	VTE should realistically evaluate secondary school curricula . . .	-.415
25	UWI should modify its matriculation requirements to insure that . . .	-.415

28	VTE programs should delay introduction of VTE until the fina . . .	-.415
32	VTE should evaluate all programs for effectiveness and termina . . .	-.415
34	VTE institutions should better manage education resources—pl . . .	-.415
45	VTE should produce a cadre of engineers capable of working in . . .	-.415
48	VTE should develop a national system of articulation with hi . . .	-.415
49	VTE administrators should work closely with employers to . . .	-.415
55	VTE courses should be added to UWI engineering programs em . . .	-.415
10	VTE institutions should offer experienced employees an oppor . . .	-.831
12	VTE programs throughout Trinidad and Tobago should be eq . . .	-.831
17	VTE institutions should establish a system of accrediting VTE . . .	-.831
19	VTE institutions should correct the current misperception that . . .	-.831
27	VTE should offer ongoing programs to stay abreast of rapidly . . .	-.831
31	VTE should engage the local business leaders in determining . . .	-.831
33	Government VTE institutions should recognize the private-sec . . .	-.831
3	VTE programs should recognize the benefits of working togeth . . .	-1.246
36	All VTE providers should come together and develop a unified . . .	-1.246
37	VTE administrators should educate students, parents, and com . . .	-1.246
42	VTE programs should incorporate management training as part . . .	-1.246
15	VTE institutions should require programs to network and/or . . .	-1.661
16	All public VTE organizations should reevaluate, justify, and . . .	-1.661
29	VTE studies should develop regional councils to insure that VTE . . .	-1.661

Appendix G8

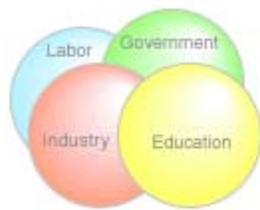
Normalized Factor Score Factor 8 (Understanding VTE's purpose)

Item No.	Statement	Z-Score
25	UWI should modify its matriculation requirements to insure that . . .	2.077
35	VTE programs should reflect the development needs of the cou . . .	2.077
43	VTE should acknowledge that creating employment is the reaso . . .	2.077
31	VTE should engage the local business leaders in determining . . .	1.661
51	VTE should insure high quality-standards at all levels of skill . . .	1.661
60	VTE should develop a long-term plan for vocational and tech . . .	1.661
27	VTE should offer ongoing programs to stay abreast of rapidly . . .	1.246
37	VTE administrators should educate students, parents, and com . . .	1.246
52	VTE should improve guidance and counseling services for prep . . .	1.246
54	VTE institutions should negotiate with top-level industry lead . . .	1.246
5	VTE should incorporate skill training at high-level especially in . . .	.831
12	VTE programs throughout Trinidad and Tobago should be eq . . .	.831
17	VTE institutions should establish a system of accrediting VTE . . .	.831
36	All VTE providers should come together and develop a unified . . .	.831
40	VTE programs should insure that their program quality measur . . .	.831
42	VTE programs should incorporate management training as part . . .	.831
48	VTE should develop a national system of articulation with hi . . .	.831
2	VTE programs should incorporate job-site training as part of . . .	.415
9	VTE teachers should stay abreast of new technologies in the . . .	.415
13	VTE should be properly aligned at the primary and secondary . . .	.415
18	VTE institutions should strengthen their linkage to the industrial . . .	.415
20	VTE should hire better-qualified teachers with industrial exp . . .	.415
30	VTE should be more widely offered in Trinidad and Tobago	.415
46	VTE programs should become more innovative, analytic, and . . .	.415
50	VTE should produce graduates who can demonstrate to society . . .	.415
58	VTE administers should encourage companies to recognize . . .	.415
1	VTE should incorporate analytical skills into their programs	.000
3	VTE programs should recognize the benefits of working togeth . .	.000
10	VTE institutions should offer experienced employees an oppor . . .	.000
14	VTE should be constructed as an integral part of the total ed . . .	.000
15	VTE institutions should require programs to network and/or . . .	.000
19	VTE institutions should correct the current misperception that . . .	.000
24	VTE institutions should develop programs that place an emph . . .	.000
26	VTE institutions should develop a unified organization to deal . . .	.000
33	Government VTE institutions should recognize the private-sec . . .	.000
38	VTE should address the issues of unequal access and inferior . . .	.000
4	VTE administrators should encourage principals of "prestige" to . . .	-.415
7	VTE programs should be updated often to reflect rapid change . . .	-.415
16	All public VTE organizations should reevaluate, justify, and . . .	-.415

23	VTE should realistically evaluate secondary school curricula . . .	-415
32	VTE should evaluate all programs for effectiveness and termina . . .	-415
39	VTE should increase the number of students enrolled in its . . .	-415
44	VTE traditional subjects at lower grades should gradually inc . . .	-415
53	VTE articulation should provide a smooth transition and cle . . .	-415
57	VTE instructors should be retrained in real world problem so . . .	-415
8	VTE should be rooted in the knowledge-based society, from . . .	-831
11	VTE should provide the flexibility for students to pursue bo . . .	-831
22	VTE should link their programs to Trinidad and Tobago's bus . . .	-831
34	VTE institutions should better manage education resources—pl . . .	-831
41	VTE should be incorporate into subject areas taught at prestige . . .	-831
55	VTE courses should be added to UWI engineering programs em . . .	-831
56	VTE should be integrated with mainstream academics in the ea . . .	-831
6	VTE institutions should include special classes as needed to . . .	-1.246
21	VTE should review existing primary and secondary levels sys . . .	-1.246
28	VTE programs should delay introduction of VTE until the fina . . .	-1.246
59	VTE should include basic life skills (conflict resolution, self-aw . . .	-1.246
29	VTE studies should develop regional councils to insure that VTE . . .	-1.661
45	VTE should produce a cadre of engineers capable of working in . . .	-1.661
49	VTE administrators should work closely with employers to . . .	-1.661
47	VTE programs should insure that their program quality meas . . .	-2.077

Appendix H

Permission to Use Copyright Information



Geoffrey S. Dean, Ed.S.

April 21, 2001

Errol Ramsaroop, Ph.D.
100 Otey Street #313
Blacksburg, VA 24061

Dear Dr. Ramsaroop,

This letter is in regards to the database and associated Internet web site that formed the components of the delivery system developed for the research project you were conducting. The Copyright applies to the both components of the research instrumentation. You have unrestricted usage of this system for future research projects you may conduct.

As a courtesy to me for the effort that was put into the development of this system, please cite me as appropriate in publications that relate to the research that this system supported. All the best and congratulations on completing your doctorate.

Sincerely,
Geoffrey S. Dean
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Pomona, IL 62975
Telephone/Fax:
(618) 893-4219
E-mail:
geoffdean@pocketmail.com

VITA

Errol Ramsaroop graduated as an Engineering Surveying Technician (1980) from John S. Donaldson Technical Institute, Port-of-Spain, Trinidad. He received a Bachelor of Science (1987) in Industrial Technology, a Master of Science (1989) in Management Technology, and an Educational Specialist (1995) in Industrial and Vocational Education from the University of Wisconsin Stout. He completed a Doctor of Philosophy degree (2001) in Vocational and Technical Education at Virginia Polytechnic Institute and State University.

Errol's professional experience includes five years in teaching, three years in research, seven years in manufacturing, and 10 years in construction. As a teacher in Trinidad, he taught 11th and 12th grade math, geography, and construction trade subjects. He also administered and coordinated a construction trades apprenticeship program. As a researcher, he worked on a collaborative project between the University of Wisconsin Stout and Northwestern Wisconsin Manufacturing Outreach Center studying the implications of technological changes in industry. This project placed second in the National Association of Management and Technical Assistance Center Project national competition (1995). He also evaluated research reports at Virginia Tech for the National Center for Research in Vocational Education Site. Errol's manufacturing experience includes administration, implementing TQM programs, process operation and control, and training and development in the manufacture of CDs, furniture, and pharmaceuticals. Construction experience includes construction management and field engineering. Errol has worked in heavy industrial--power and processing plants--single and multi-residential construction.

His professional and honorary affiliations include the American Vocational Education Research Association, Association for Career and Technical Education, Epsilon Pi Tau, International Vocational Education and Training Association, and Omicron Tau Theta.