Instructors' perceptions of higher technological and vocational education reform in Taiwan the Republic of China

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Instructors' Perceptions of Higher Technological and Vocational 
Education Reform in Taiwan, the Republic of China

By

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for the degree of
Doctor of Education

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Taiwan's higher technological and vocational education (HTVE) reforms were intended to convert all traditional junior colleges into institutes of technology or universities of technology. Reforms increased instructors' responsibilities and obligations rapidly without commensurate increase in pay or a recognition of their present workload. Limited time was given to prepare for these comprehensive changes with no financial assistance to offer for additional education.

This research found no important or consistent predictability of instructors' attitude, instructors' quality, students' quality, pedagogy, and technological utilization using instructors' age, years of teaching experience in higher education, years of teaching in the present institution, class size, number of classes taught, and number of advising students. While there existed a strong level of positive perception among the decisive respondents, that level of support (or lack of positive perception) was not predictable based upon a multitude of predictive factors. It was notable that student quality received the strongest negative reaction from all respondents. Additional analysis found that perception of educational reform varied by gender, college affiliation, level of education, and teaching rank.

When all respondents were considered as a whole, the instructors' perceptions were modestly positive. When decisive responses were considered, the result was a strong positive perception. There was a high level of agreement between the instructors' belief in the importance of additional workload requirements and their expectations to contribute to educational reform. However, it was equally important to note that instructors believed that additional compensation, on the average of $1500 U.S. per month, was appropriate for the extra time and commitment.

Instructors responded that research was the most difficult area for them to fully meet, followed by additional education, teaching, advising students, and services. Instructors' comments reinforced issues of workload, training, and financial support were of concern for participants. Instructors indicated a need for more programs or professional training in order to improve their pedagogy. The positive attitude and response toward increased workload could be improved by two additional considerations from the government: a modest additional compensation to recognize the increased workload, and additional funding for professional technology development.
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>v</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>ix</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xii</td>
</tr>
<tr>
<td>CHAPTER ONE: STATEMENT OF THE PROBLEM</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>The Problem</td>
<td>3</td>
</tr>
<tr>
<td>Research Question</td>
<td>5</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>6</td>
</tr>
<tr>
<td>Importance and Significance of the Study</td>
<td>6</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>8</td>
</tr>
<tr>
<td>Role of the Researcher</td>
<td>15</td>
</tr>
<tr>
<td>Summary</td>
<td>15</td>
</tr>
<tr>
<td>CHAPTER TWO: REVIEW OF RELATED LITERATURE</td>
<td>16</td>
</tr>
<tr>
<td>Higher Education Reform Trends</td>
<td>16</td>
</tr>
<tr>
<td>Educational Reforms of the United States of America</td>
<td>19</td>
</tr>
<tr>
<td>Educational Reforms of United Kingdom</td>
<td>30</td>
</tr>
<tr>
<td>Educational Reforms of Australia</td>
<td>32</td>
</tr>
<tr>
<td>Educational Reforms of European countries</td>
<td>34</td>
</tr>
<tr>
<td>Educational Reforms of the Asian Pacific Regions</td>
<td>35</td>
</tr>
<tr>
<td>Table</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>Table 1:</td>
<td>Return Percentage of Survey</td>
</tr>
<tr>
<td>Table 2:</td>
<td>Demographics of Surveyed Instructors</td>
</tr>
<tr>
<td>Table 3:</td>
<td>Frequencies and Percentages for the Responding Instructors</td>
</tr>
<tr>
<td>Table 4:</td>
<td>Frequencies and Percentages of Instructor’s Attitudes toward Educational Reform</td>
</tr>
<tr>
<td>Table 5:</td>
<td>Frequencies and Percentages of Instructor’s Work Environment</td>
</tr>
<tr>
<td>Table 6:</td>
<td>Frequencies and Percentages of Leadership</td>
</tr>
<tr>
<td>Table 7:</td>
<td>Frequency and Percentage of Instructors’ Workload Increased</td>
</tr>
<tr>
<td>Table 8:</td>
<td>Frequencies and Percentages and Mean of Additional Hours per Week of Instructors’ Workload</td>
</tr>
<tr>
<td>Table 9:</td>
<td>Frequencies and Percentages of the Necessity and Compensation per Week of Instructors’ Workload</td>
</tr>
<tr>
<td>Table 10:</td>
<td>Frequencies and Percentages of Instructors’ Quality</td>
</tr>
<tr>
<td>Table 11:</td>
<td>Frequencies and Percentages of Students’ Quality</td>
</tr>
<tr>
<td>Table 12:</td>
<td>Frequencies and Percentages of Pedagogy</td>
</tr>
<tr>
<td>Table 13:</td>
<td>Frequencies and Percentages of Information Technology</td>
</tr>
<tr>
<td>Table 14:</td>
<td>The Percentages of Responses as Determined by Questions 13-51</td>
</tr>
<tr>
<td>Table 15:</td>
<td>The Percentages of Positive Responses of Instructors’ Attitudes toward Educational Reform as Determined by Questions 13-17</td>
</tr>
<tr>
<td>Table 16:</td>
<td>The Percentages of Positive Responses of Instructors’ Work Environment toward Educational Reform as Determined by Questions 18-22</td>
</tr>
</tbody>
</table>
Table 17: The Percentages of Positive Responses of Leadership toward Educational Reform as Determined by Questions 23-24 .......................................................... 104

Table 18: The Percentages of Responses of Instructors’ Workload Increased after Educational Reform as Determined by Questions 25 ............................................. 105

Table 19: The Percentages of the Necessity of Requirements for Instructors’ Workload, Additional Hours per Week, and Additional Compensation per Week as Determined by Questions 26-27 ........................................................................ 105

Table 20: The Percentages of Positive Responses of Instructors’ Teaching Quality toward Educational Reform as Determined by Questions 31-35 ..................... 106

Table 21: The Percentages of Positive Responses of Students’ Quality toward Educational Reform as Determined by Questions 36-40 ........................................... 106

Table 22: The Percentages of Positive Responses of Pedagogy toward Educational Reform as Determined by Questions 41-45 ................................................. 107

Table 23: The Percentages of Positive Responses of Information Technology toward Educational Reform as Determined by Questions 46-51 ....................................... 107

Table 24: The Differences of Overall Averages of Instructors’ Perceptions toward Instructors’ Attitudes, Instructors’ Quality, Students’ Quality, Pedagogy, and Information Technology ................................................................................ 108

Table 25: Workload that Instructors Thought that They May Not Be Able to Meet .... 108

Table 26: Major Obstacles to Achieving Educational Goals ........................................... 109

Table 27: The Frequencies and Percentages of Suggestions for Improving the Quality of Taiwan’s Higher Education ........................................................................ 111
Table 28: The Frequencies and Percentages of Three Positive Answers toward Each of Five Domains ..................................................................................................................113

Table 29: The Distribution of Descriptive Variables by Domains.................................................116

Table 30: Comparing the Results of Questions 40 and 50 ..............................................................117

Table 31: The Percentages of Uncertain Responses Quartiles ........................................................124
LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 48</td>
<td>118</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 43</td>
<td>118</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 35</td>
<td>119</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 47</td>
<td>119</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 37</td>
<td>120</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 41</td>
<td>120</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 44</td>
<td>121</td>
</tr>
<tr>
<td>Figure 8</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 39</td>
<td>121</td>
</tr>
<tr>
<td>Figure 9</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 31</td>
<td>122</td>
</tr>
<tr>
<td>Figure 10</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 33</td>
<td>122</td>
</tr>
<tr>
<td>Figure 11</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 51</td>
<td>123</td>
</tr>
<tr>
<td>Figure 12</td>
<td>Percent of Positive, Negative, and Uncertain Responses for Question 45</td>
<td>123</td>
</tr>
<tr>
<td>Figure 13</td>
<td>Percent of Positive/Negative Responses of Decisive Answers toward</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Instructors' Attitudes from Questions 13-17</td>
<td>130</td>
</tr>
<tr>
<td>Figure 14</td>
<td>Percent of Positive/Negative Responses of Decisive Answers toward</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Instructors' Quality from Questions 31-35</td>
<td>132</td>
</tr>
<tr>
<td>Figure 15</td>
<td>Percent of Positive/Negative Responses of Decisive Answers toward Students'</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quality from Questions 36-40</td>
<td>134</td>
</tr>
<tr>
<td>Figure 16</td>
<td>Percent of Positive/Negative Responses of Decisive Answers toward</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pedagogy from Questions 41-45</td>
<td>135</td>
</tr>
</tbody>
</table>
Figure 17: Percent of Positive/Negative Responses of Decisive Answers toward
Information Technology from Questions 46-51.............................................137

Figure 18: The Overall Percent of Positive, Negative, Uncertain Responses toward
Instructors' Attitudes from Questions 13-17....................................................139

Figure 19: The Overall Percent of Positive, Negative, Uncertain Responses toward
Instructors' Quality from Questions 31-35 ....................................................140

Figure 20: The Overall Percent of Positive, Negative, Uncertain Responses toward
Students' Quality from Questions 36-40........................................................140

Figure 21: The Overall Percent of Positive, Negative, Uncertain Responses toward
Pedagogy from Questions 41-45.................................................................141

Figure 22: The Overall Percent of Positive, Negative, Uncertain Responses toward
Information Technology from Questions 46-51.............................................141

Figure 23: The Comparison of the Percentages Regarding Instructors' Attitudes,
Instructors' Quality, Students' Quality, Pedagogy, and Information Technology
..................................................................................................................153
CHAPTER ONE

STATEMENT OF THE PROBLEM

Introduction

According to Altbach (1991), many developing and industrialized countries are recognizing the importance and value of higher education reform. Higher education reform varies from country to country. Altbach (1991) posited that "The demands placed on institutions of higher education to accommodate larger numbers of students and expanding functions resulted in significant reforms in higher education in many countries" (p. 303). He also indicated, "... the expansion of higher education has been the most important single postwar trend worldwide" (Altbach, 1991, p. 299). Higher education reform has played a major role in developing the new quality of educational leadership so vital to the modernizing process (Yang, 2001).

Taiwan, the Republic of China (Taiwan, R. O. C.) (hereafter referred to as Taiwan) is now developing scientific and industrial capacity and depends on academic institutions to provide high-level training as well as research expertise (Altbach, 1991). The educational system in Taiwan is basically a two-track system that separates the academic versus technological and vocational education (Lin, 1995). Senior high students can be admitted to higher education through either the technology channel or the comprehensive university channel.

In order to catch up to the worldwide trend, the government in Taiwan has been championing higher education reforms with enthusiasm. The Taiwan Ministry of Education (hereafter referred to as MOE) indicated that higher technological and vocational education (hereafter referred to as HTVE) reforms have been actively
implemented since 1996 (The MOE, 2001). First, there were dramatic and rapid changes in the policies affecting HTVE. A junior college is being upgraded in two phases, to an institute of technology initially and then to a university of technology. According to the statistics of the MOE, from 1998 to 2001, the number of junior colleges has decreased from 53 to 19, the number of institutes of technology has increased from 45 to 78, and universities of technology have increased from 39 to 57. The total number of universities is 154, including 57 of the comprehensive universities. There are 1.187 million students enrolled in these 154 universities (The MOE, 2001). These educational facilities served approximately 50 percent of the relevant age cohort.

Second, on January 5, 1994, the Taiwan Ministry of Education announced new regulations offering universities more academic and administrative independence. Therefore, some reforms in the university education system were centered on academic self-determination and university independence, allowing universities and colleges to determine their own personnel, administrators, such as presidents, deans and department heads. Personnel are elected or appointed according to a variety of methods in each university. Universities have more authority in determining the rank and qualifications of instructors. The huge and rapid HTVE reform has had a great impact on approximately 19,000 instructors (Lin, 2000). Universities are gradually being authorized to examine the quality of instructors. University education has become more open and liberal (The MOE, 2001). More importantly, universities are promoting foreign language learning as integral to the goal of internationalization. As the MOE (2001) announced:

To promote international cultural-educational cooperation, the government assists colleges and universities to enter into academic cooperation with foreign schools;
sponsors international academic seminars and encourages schools and experts to attend international academic conferences. Moreover, efforts have been devoted to expanding international cultural, educational, and artistic exchanges. In 2000, a total of 44 cultural, educational, and academic personnel from 18 nations were invited to visit Taiwan (The MOE, 2001, International Cultural and Educational Exchanges section, para. 1).

The Taiwan Ministry of Education plays an important role in international communities and is engaged in substantive and mutual cultural and educational exchanges.

The Problem

*Educational Reforms*

Taiwan is in its seventh year of the massive technological and vocational reforms in higher education. These reforms are intended to convert all traditional junior colleges into institutes of technology or universities of technology. According to the MOE, this is being done to upgrade the quality of student education.

Taiwan has been confronted with problems that were caused by the global trends of internationalization (Yang, 2001). As part of the closely interconnected global system that resulted from western rationalistic logic, Taiwan cannot escape the western influences on its educational innovation (Yang, 2001).

*Goals of Educational Reform*

While one goal of internationalizing education is to open the door to better mutual understanding and appreciation of other cultures, the primary goal of educational globalization is to increase Taiwan's international economic status in the new century. It is with this goal that Taiwan is internationalizing its educational system.
One measure for promoting educational internationalization is a demand for a higher quality of instructors and more effective teaching on their part. The Taiwan MOE through their policies, is also promoting a system of credits transfer between universities, creating inter-university and international programs, encouraging foreign teachers to practice in Taiwan schools, and assisting students to study abroad (Yang, 2001).

The Taiwan MOE stated that current educational reform objectives are to establish a modern education suited to Taiwan’s particular needs in order to produce outstanding modern citizens, acquire new knowledge from other cultures and countries, improve pedagogical methods and thereby upgrade technological skills, and create a modern nation that is economically competitive on the world stage (The MOE, 2001). Fundamental to these goals is that educational reform increases Taiwan’s economic competitiveness internationally. The Taiwan government believes that educational reform will play a central role in achieving economic success.

To this end, HTVE reform in Taiwan has mandated a number of changes to be implemented. These changes are:

**Additional Requirements for Instructors**

The role of instructors is one of the major changes being implemented in Taiwan HTVE reforms. Instructors are being required to learn new technology in order to be in compliance with requirements of the reform policies for education. Instructors are urged to obtain a doctoral degree to be a professor. Instructors are being required to publish research at prescribed times in order to achieve recognition in their academic field. The Taiwan Ministry of Education suggests that these reforms promote a greater emphasis on quality education, and also stress excellence in teaching (The MOE, 2001).
With these reforms, instructors’ workloads have increased dramatically. Prior to reforms, the role of junior college instructors was mainly as a lecturer much like an adjunct or visiting professor in the United States. Following rapid educational reforms, the instructors’ responsibility has been expanded to include research, administrative functions, community service, and counseling/advising students (Lin, 2000). Taiwan’s HTVE reforms are requiring instructors to do research that they may not be prepared to execute. The new educational reforms increased instructors’ responsibilities and obligations rapidly without a commensurate increase in pay or a recognition of the work they were already performing. Instructors have been given limited time to prepare for these comprehensive changes with no financial assistance to gain the additional education.

There may be some problems created by this gap between administration (decision makers) and instructors. Factors such as increased workloads requiring rapid HTVE reform without additional compensation may result in excessive dissatisfaction among instructors. In addition, instructors may quit their jobs, leave their profession, or take early retirement under these increased workload stresses. As a result, this may cause a shortage of qualified instructors, diminished educational quality, and missed economic goals. More importantly, this may cause Taiwan not only to fail to improve its economic competitiveness but worse, to lose its present place in the global economy.

Research Question

The general question to be addressed by this research was: How do Taiwan’s technological and vocational instructors perceive the progress and success of higher education reform and their own role within that reform?
Purpose of the Study

The purpose of this study was to analyze the instructors' perceptions of HTVE reform and their perceptions of the progress and success of that reform as well as their own role within that reform in the Institutes of Technology or Universities of Technology. This analysis would serve to document the present status of educational reform in Taiwan as perceived by the instructors as well as provide indicators of instructors' attitudes toward that reform. It was anticipated that there would be a relationship between the success of reform, or lack thereof, and the attitude towards reform from those who were expected to deliver that reform.

Importance and Significance of the Study

The importance of this study was that it provided the means by which those factors that were contributing positively to educational reform, as well as those that were hindering it, be identified and treated appropriately. This importance was magnified by Hanushek (2003) who stated that education quality is positively related to national productivity and economic growth. It is clear that instructors' positive responses are needed in order to help Taiwan produce the level of education necessary to keep up with the proposed economic development. Educational policy must be related to the objectives of economic development. Therefore, there is an urgent need to upgrade the quality of Taiwan's education and training if it is to retain and strengthen its socio-economic position in the future. This study will also provide valuable information to the Ministry of Education, in its role of educational administration and solidifying its relationships with its instructors/teachers.
Lin (2000) indicated that instructors play an important role in the success of educational reform. At this moment there are 14 Institutes of Technology located at the central district of Taiwan where approximately 4,000 instructors and 120,000 students are being influenced by current educational reforms (The MOE, 2003). If it is discovered that progress is being made in harmony with educational reforms, the government will have some assurance that new policies are producing their intended results. If this harmony is found, it may encourage instructors’ motivation to contribute their professional knowledge to the school and students. As educational quality improves, the outlook for attaining economic goals also improves. The whole of economic competition can be increased, and Taiwan will have the ability to improve its economic growth and place in the global economic community. If obstacles to this progress emerge in the findings of this research, Taiwan governmental officials would have better awareness of the problems and opportunities needed to address them. Only in this way can national development progress rapidly, and bring economic prosperity. In return, everyone will be able to make great contributions to the social, economic, political and cultural aspects of the society.

The Organisation for Economic Cooperation and Development (OECD, 1989) stated that it is obvious that “the world’s most successful economies over the past two decades have given a high priority to education, skills, and training as vital factors in their economic success, and have framed their policies accordingly” (p. 11). Taiwan’s universities are an important source of progress and new ideas for economic growth. The Organisation for Economic Cooperation and Development (OECD, 1989) indicated that “If the relationship between economic growth and social progress cannot be maintained, the social consensus so necessary for harmonious adaptation to changing economic circumstances will be threatened” (p. 18).
The Organisation for Economic Cooperation and Development (OECD, 1989) also indicated that education provides a contribution to the performance of economies in that its, "... contribution will itself be most effective when it is part of an overall strategy of economic, regional and enterprise restructuring and modernization" (p. 112). In order to positively shape Taiwan's higher educational future, a more accurate vision is required of what instructors, in Institutes of Technology or Universities of Technology, will need to be able to carry out new objectives.

*Leadership*

The findings of this study would help the Ministry of Education to evaluate the status of HTVE reforms. In addition, these findings would aid the Taiwan government's ability to modify and improve implementation of educational reform. This research would also assist educational leaders in identifying factors that are conducive to reform as well as instructors' concerns that are hindering reform.

*Definition of Terms*

The following terms used in the research are defined as used in the 1996 Taiwan HTVE reforms policy.

*Additional Workload Responsibility under Educational Reforms*

*Counseling/Advising Students*

This concept broadly includes every instructor being responsible for counseling/advising students' academic performance and helping students adapt successfully into academics and off-campus daily life. Counseling/advising students demands a very high level of commitment and involvement on the part of instructors. Instructors' responsibilities included in this concept are 24/7 availability to students, extra
attention for learning disabled students, campus physical environment maintenance, visiting students in their homes, and mentoring students during club activity, field trips and other extra-curricular activities. Attendance at counseling/advising workshops is also mandated (HungKuang University, 2003).

Increased Academic Preparation

People who would like entry into the academic profession must have a doctoral degree. Instructors must pursue doctorates either in foreign countries or domestic universities to comply with this mandate. If instructors don’t have doctoral degrees, they must submit a dissertation or a research paper to be evaluated. The Ministry of Education designates a committee of professors to evaluate this research. If the research or the dissertation has been approved by the committee of professors, the Ministry of Education may promote an individual from lecturer status to an assistant professor or an associate professor. In addition, instructors need to obtain a license in their specific and professional academic field, or obtain an Outstanding Contribution award from the government or from their related industrial field. More importantly, instructors must possess the ability and enthusiasm to obtain a research project or financial grant from the industrial field, the National Science Council (NSC), or the Ministry of Education (HungKuang University, 2003).

Research

Under the new educational reform, faculty members must meet strict research performance expectations. These expectations of research include the publication of research in prestigious journals within five years, other scholarship, and creative activities. There are other additional expectations including acquiring higher credentials
in the appropriate academic discipline, such as successful patent application, accrual of
government awards, international and domestic conference attendance, and artistic shows
or performance when applicable (HungKuang University, 2003).

*Service*

Service consists of administrative contributions (service for a variety of on
campus committees) and community service around one’s school district. Service
encompasses additional responsibilities ranging from serving on institutional committees
and participation in school development, through community involvement in many areas,
and on to student issues such as job placement and inter-collegiate contests (HungKuang
University, 2003).

*Teaching*

Teaching is the responsibility for instructors in higher institutions to cultivate and
enhance students’ competitive capability. Taiwan’s Ministry of Education indicated that
its ‘Pursuing Academic Excellence Project for Developing Universities’ is to encourage
instructors to enhance their own academic level and develop students’ individual
characteristics (The MOE, 2001, Trend in Higher Education Reforms section, para. 1).
Within the Taiwanese teaching hierarchy, there are four levels (lecturer, assistant
professor, associate professor, and professor) with in-class instruction time varying from
eight to twelve hours per week. In addition to these responsibilities, all instructors are
required to be involved in two other areas. The first is to participate in a competition
within the university to design multi-media programs related to one’s field of study, and
the second is to teach a course on methods of conducting research in one’s academic
discipline (HungKuang University, 2003).
Educational Reforms

The transformation of the educational system is to promote the development and progress of education and, hence, the nation (The MOE, 2001).

Higher Technological and Vocational Education Reforms

Five-year systems and two-year systems of junior colleges are being upgraded in two phases, to institutes of technology initially and then to universities of technology (Lin, 2000, p. 109).

Institute of Technology and University of Technology

Both institutes of technology and universities of technology have government and private sector sponsors. They offer vocational school graduates opportunities to pursue advanced study. There are two-year and four-year programs. Two-year programs admit junior college graduates and four-year programs admit vocational senior high school graduates. Students must pass an entrance examination in order to be admitted. They both have undergraduate, master and doctoral programs. Undergraduate programs are two-year and four-year, and are also open to individuals in the workforce (The MOE, 2001, Universities of Technology and Institutes of Technology section, para. 1).

Junior College

The Junior College System is divided into two types, two-year and five-year programs. Currently, students from comprehensive senior high or vocational senior high schools may enter two-year junior colleges. Admission standards require that students meet certain eligibility requirements and pass either an entrance examination or a qualifying examination. Five-year junior colleges will admit junior high school graduates. Admission standards require students to go through the school assignment process and
registration. Junior colleges may be government or privately run. However, most junior colleges in Taiwan are private. In junior colleges certificates are conferred on students, upon completion of all graduation requirements. The objective is to teach applied sciences and technology and to turn out a workforce with mid-level technical or managerial skills (The MOE, 2001, Junior Colleges section, para. 1).

Two-Track System

The educational system in Taiwan is basically a two-track system that separates the academic versus technological and vocational education (Lin, 1995).

Factors Related to Educational Reform

Change Phenomena

Change invokes simultaneous personal feelings of fear and hope, anxiety and relief, pressure and stimulation, threats to self-esteem and challenges to master new situations (Fullan & Stiegelbauer, 1991).

Communication

Communication is a process where a message sender intentionally stimulates a desired message in the mind of a receiver (Koehler & Pankowski, 1997, p. 88). Team learning is the process of aligning and developing the capacities of a team to create the results its members truly desire. Team learning builds on personal mastery and shared vision, which allows people to be able to act together (Senge, 1990, p. 236). Two-way, top-down/bottom-up solutions are needed in which schools and districts influence each other through a continually negotiated process and agenda (Fullan, 1993, p. 128).

Information Technology

There are two overarching conditions of higher education: (a) Transforming the
structures and practices of higher education trends, and (b) globalization and the incorporation of new information and communication technologies into the knowledge activities of research, publication, and pedagogy (Burbules & Callister, 2000).

**Instructors' Quality**

Higher education should take responsibility and undertake needed reforms. A period of innovation provides remarkable opportunities to improve the quality of the academy, and the energy for reform can be combined with the spectrum of available innovations to provide more vital intellectual communities (Carnegie Commission, 1972). Glassick, Huber, and Maeroff (1997) recommended judging the claims of teaching quality on six counts: goal clarity, preparation, appropriate methods, significant results, effective presentation of material, and reflective critique.

**Leadership**

Leadership plays an important role in the creation, survival, growth, and decay of an organization (Conger & Kanungo, 1998). The transformational leader communicates high expectations, uses symbols to focus efforts, and expresses important purposes in simple ways (Bass, 1990, p. 22). Transformational leadership provides encouragement and support to followers, assists their development by promoting growth opportunities, and shows trust and respect for them as individuals. The role of a transformational leader is to bond the leader and the led, and to build follower self-confidence and heighten personal development (Bass & Avolio, 1993).

**Motivation**

Psychic rewards opportunities for fulfillment, and self-actualization in the workplace are major sources of faculty motivation (Knight, 2002, p. 11). Herzberg et al
(1959) constructed a two-dimensional paradigm of ‘hygiene’ (dissatisfiers) factors and ‘motivators’ (satisfiers). Five motivators in particular were strong determiners of job satisfaction including achievement, recognition, the work itself, responsibility, and advancement. Maslow’s (1970) hierarchy ranks needs from the psychological, through safety, love and belongingness, esteem, and self-actualization. He theorized that a person could not pursue the next need until the currently recognized need was substantially or completely satisfied.

Pedagogy

The array of information technologies in recent years has increased the scholarly power of professors. E-mail, fax machines, the World Wide Web, and CD-ROMs have greatly enhanced access to information sources and also increased the speed of information retrieval (Baldwin, 1998, p. 11). The new education reform’s concern is “the application of technology to the students and the traditional structures and pedagogies employed in the education of those students” (Gandolfo, 1998, p. 25). Education reform needs to rely more on sound pedagogy in the design and delivery of online courses and helping students select learning strategies most appropriate to their individual circumstances (Cathleen, 2000).

Stress

The stresses and tensions associated with school reform were caused by (a) school based management, (b) accountability, (c) curriculum initiatives, (d) career ladders (respect, prestige), and (e) the intense atmosphere and professional demands (Farber & Ascher, 1991).
Students' Quality

"The academic reforms in higher education which will enhance the opportunity for each student, given [one's] natural strengths, to find a learning environment that will best help [one] to create for [oneself] a fuller and more satisfying life" (Carnegie Commission, 1972, p. 1). "Students make significant gains in subject matter knowledge and in their ability to think critically. They also gain in personal integration and autonomy, in flexibility and open-mindedness, and in intellectual and cultural interests" (Vermilye, 1975, p. 55).

Role of the Researcher

The methodology and survey were designed by the researcher. The survey was distributed by a non administrative coordinator selected from each school by the researcher. The researcher also selected a head coordinator to pick up the surveys from the school coordinators. The researcher will enter and analyze all data. In this way, any research bias will be eliminated from the data gathering process.

Summary

This chapter discussed introduction of the study, statement of the problem, research question, purpose and significance of the study, definition of terms, and role of the researcher. These background descriptions will elaborate on themes which frame this study on the instructors' perceptions of Institutes of Technology or Universities of Technology to the rapid educational reforms began working actively since 1996.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

Literature that pertains to rapid educational reforms is reviewed in this chapter. This review consists of studies and information relevant to the following areas: (a) higher education reform trends, (b) higher education reforms of the U.S., United Kingdom, Australia, European countries, and Asian Regions, (c) Taiwan’s higher technological and vocational education reforms, (d) change and managing change, (e) leadership style and decision making, (f) instructors’ academic role and productivity, (g) communication, and (h) motivation to facilitate educational reform. The following review of the literature will elaborate on themes which frame this study of the perception of instructors of Institutes of Technology or Universities of Technology to the rapid educational reforms that were fully activated and implemented in 1996.

Higher Education Reform Trends

In the review of the literature, reforms throughout the world have elucidated new trends. Trow (1975) spoke of expansion where education transitioned from the elite to the masses, and then in the industrialized nations to universal higher education. He also articulated that Third World higher education expanded rapidly in the immediate post independence period. Howard-Vital and Rosenkoetter (1999) posited that institutions were forming alliances; others were aggressively seeking new markets in areas where they directly competed with institutions that they never competed with before globalizing their opportunities. Kezar (1999) mentioned much of the literature about the global marketplace is emerging from the business world and purported that there needs to be an accompanying educational globalization perspective.
An additional trend is that funding for higher education is being tied to performance indicators, representing more concern about accountability (Banta, et al., 1996). Altbach (1991) indicated, "Universities have traditionally claimed significant autonomy for themselves...the conflict between autonomy and accountability has been one of the flashpoints of controversy in recent years" (p. 306). Another concern in the field of education according to Altbach (1991) is the role of the private sector in funding and directing university research. In recent years, there has been an increase in the establishment of research institutions, community colleges, polytechnics, and other academic institutions which are being designed to meet specialized needs and serve specific populations (Altbach, 1991). As Yang (2001) indicated and the Joint Statement of the Second Asia-Pacific Economic Cooperation (APEC) Education Ministerial Meeting (2000) declared, the world is now truly the global village it was once envisioned to be. The advancement of science and technology has made all parts of the world much more interconnected and mutually interdependent. Global economic and social trends will have impacts on the education (Yang, 2001).

Worldwide, about seven percent of the relevant age cohort attends postsecondary educational institutions, and this has increased for each decade since World War II. Immediately following World War II, higher education increased dramatically first in the United States and then in Europe. Currently, the main focus of the expansion is in the Third World and the newly industrialized countries (Altbach, 1991). Altbach (1991) indicated:

Many analysts writing in the 1960s assumed that the world, and particularly the Western industrialized nations, would move from elite to mass and finally to
universal access to higher education, generally following the American pattern (Trow, 1975). Generally, the proportion of the age cohort going on to higher education has stabilized.... While there are common world-wide trends, such as the increasingly important role of technology, there are also important differences among countries... expansion will continue to be a key factor in higher education.... Rapidly expanding economies, such as those of the newly industrializing countries in East Asia, will have the resources to expand higher education.... University-based research is widely seen as an important ingredient for scientific and technological strength in an increasingly competitive world economy.... Vocationalization has been an important trend in higher education change in the past two decades. Throughout the world, the conviction has grown that the university curriculum should provide relevant training for a variety of increasingly complex jobs.... Curricular vocationalism is closely related to another crucial worldwide trend in higher education-the increasing collaboration between universities and industry. (pp. 301-305)

Several other trends are also notable for higher education, such as bureaucratization, accountability, educational quality, access to technology, redefining higher education, globalization, life-long learning, continuing education and certification (Kezar, 1999). Researchers are struggling to study the impact of trends in these areas on future efforts (Kezar, 1999).

In summary, western universities were seen as successful in providing advanced education, fostering research and scientific development, and assisting their societies in the increasingly complex task of development. There are significant national differences,
which will continue to affect the development of academic systems and institutions.

Unexpected change is also possible while circumstances change.

*Educational Reforms of the United States of America*

American educational system has seen at least three educational reform movements in the past twenty years. The National Commission on Excellence in Educational Administration (NCEEA, 1983) reported that in 1983—*A Nation at Risk* came to be the first wave of an educational reform movement. *A Nation at Risk* in 1983 was most influential because it galvanized public opinion in recognizing the need for reform in America’s schools (Jacobson & Conway, 1990). The central concern of first-wave reformers was that economic growth depended on the quality of education. Reformers warned that America’s public educational system should improve quickly, otherwise it would lose its position of pre-eminence among the world’s industrialized nations in commerce, industry, science, and technological innovation (Jacobson & Conway, 1990).

In 1986, the Holmes Group (1986) and the Carnegie Forum on Education and the Economy (Carnegie Forum, 1986) reported that the second-wave of reforms emerged in 1986. They claimed that a lasting educational improvement was contingent on both a reconsideration of the quality of teacher preparation and a restructuring of the roles and opportunities available to individuals making teaching their profession (Jacobson & Conway, 1990).

In 1987, the National Commission on Excellence in Educational Administration (NCEEA) indicated that a third-wave of educational reform was at hand (UCEA, 1987). They were concerned about the roles of educational administrators and their managing efforts in school improvement. In addition, the educational reforms specifically focus on
the role expectation for future educational leaders and strategies for recruiting (Jacobson & Conway, 1990).

Higher Education

Higher education in America has been marked by greater diversity. This diversity has been one of the greatest strengths of higher education; a major source of much of its dynamism. The Carnegie Commission (1972) pointed out:

Over the long success of history, this diversity has increased—public colleges have been added to private, the university has arisen, the community colleges have been created, and teachers colleges have become comprehensive colleges. But recently, this trend has been reversed toward homogenization. The private college has occasionally become public; the single-sex college has often become coeducational; the sectarian college has become nonsectarian; the smaller institution has given way to the larger as the dominant location of students; the single-purpose institution has become multipurpose; the community college has occasionally become a comprehensive college; and the comprehensive college has sometimes become a university. Particularly since World War II, the major direction of homogenization has been generally toward science, toward research, and toward graduate study and, for the individual faculty member, toward identification with a single discipline. Some of these directions of change have been highly desirable. (p. 35)

Higher education in America concerns the following major contents:
Instructors’ quality. The Organisation for Economic Cooperation and Development (OECD, 2001) stated:

Teachers become still more critical to the success of schooling as expectations about quality increase. Responses to these pressures will often result in teachers having to operate in new organizational structures, in close collaboration with colleagues and through networks, facilitating learning and overseeing individual development. (p. 140)

As the Carnegie Commission (1972) stated, “We believe that an attitude among faculty members now exists favorable to innovation and change—as witness faculty support for more relevant curricula and more attention to teaching” (p. 61). Higher education should take responsibility and undertake needed reforms. A period of innovation provides remarkable opportunities to improve the quality of the academy, and the energy for reform can be combined with the spectrum of available innovations to provide more vital intellectual communities (Carnegie Commission, 1972).

According to Code of Teaching Responsibility and Statement of Rights of Students to Receive Instruction from Michigan State University (1970), the teaching responsibilities of the instructional staff are: instructional staff members are responsible for stating clearly the instructional objectives of each course they teach at the beginning of each term, instructional staff members are responsible for informing students in their classes of the methods to be employed in determining the final course grade and of any special requirements of attendance, it is expected that graded examinations and papers will be provided to the students for inspection and discussion, all instructional staff members are expected to meet their classes regularly and at scheduled times, all
instructional staff members whose responsibilities involve students are expected to schedule a reasonable number of office hours for student conferences, and instructional staff members who are responsible for academic advising are expected to be in their offices at specified hours. The purpose of this Code is to protect academic freedom, to help maintain the highest standards of teaching and scholarship and in order to advance the mission of the University as an institution of higher learning.

There are some changes that are strongly desired by students and by faculty members including: improvement of teaching effectiveness for good teaching and provision of more creative opportunities for students (Carnegie Commission, 1972). The Carnegie Commission (1972) pointed out that “Higher education can, with confidence, embark upon the changes necessary in the present and for the future knowing that its academic performance has been generally adequate and often superior” (p. 3). Teaching which places a greater emphasis on the prestige of the art, particularly teaching performance is one of the rating criteria. Teaching, however, is notoriously difficult to evaluate-it is an art more than a science. Beyond the standard methods-examination of syllabi, observations of classes and seminars, and others are considered (Carnegie Commission, 1972).

Murray (1997) concluded that the research evidence consistently identifies three general qualities that mark good instruction: enthusiasm and expressiveness, clarity of explanation, rapport and interaction. Good instruction is represented as a personal. Glassick, Huber and Maeroff (1997) recommended judging the claims of teaching quality on six counts: goal clarity, preparation, appropriate methods, significant results, effective presentation of material, and reflective critique. Vermilye (1975) demonstrated that
university faculties are beginning to invite the help of their colleagues more and more, and mutual support through class observations and pedagogical discussion is an increasing trend. In addition, Knight (2002) suggested that the new emphasis on faculty development is helping some instructors develop skills to improve the teaching curriculum. Knight (2002) also indicated, “Today, new concepts of instructional improvement are being advanced and new programs are providing opportunities for faculty members to enhance one or more aspects of their teaching” (p. 91).

Linehan (2001) indicated that the core component of the education reform movement of the 1990’s is teacher accountability. Teacher quality is a shared responsibility and every teacher must have the ability to teach (Linehan, 2001). Linehan stated, “Every teacher needs to have a certain level of skill in certain areas of content, classroom management, and program planning.... All teachers have a responsibility to all students and must seek additional information necessary to serve them appropriately” (p. 3). In addition, he purported that “Policymakers realize that the success of current reforms and accountability depend on qualified teachers. Teacher quality encompasses the following areas: teacher preparation, teacher recruitment, teacher retention through salary/benefits, certification and professional development” (p. 4). Linehan concluded, “National Board Certification by the National Board for Professional Teaching Standards generally considered a rigorous process requiring teachers to demonstrate exemplary knowledge and skills in pedagogy” (p. 5).

Students’ quality. As the Carnegie Commission (1972) stated:

We propose academic reforms in higher education which will enhance the opportunity for each student, given his/[her] natural strengths, to find a learning
environment that will best help him/her to create for himself/herself a fuller and more satisfying life. (p. 1)

In addition, the Carnegie Commission (1972) stated:

The student community is now highly diverse in ability, in achievement, in age, and in academic and occupational interests—and is becoming more so. This requires more variety of courses and programs, and more differentiation is standards of performance.... Students are more likely to undergo subsequent on-the-job training, and are more likely to engage in adult education than ever before. College is now more a part of lifetime education and less a unique and complete experience. (p. 23)

However, the Carnegie Commission (1972) concluded, “Testing, now can be and needs to be improved, and more widely used both in academic, vocational, and in granting credit for achievement outside instruction in the formal classroom” (p. 53).

Knight (2002) pointed out that teachers expect students to focus on professional disciplines that value procedural knowledge. He also indicated that there is an increasingly strong conviction that higher education should also develop generic attributes that contribute to students’ employability. Knight demonstrated, “There is a tendency to identify employability with the possession of core, or key, skills at the very least” (p. 31). Vermilye (1975) indicated some changes seem to occur during college learning. He reported, “Students make significant gains in subject matter knowledge and in their ability to think critically. They also gain in personal integration and autonomy, in flexibility and open-mindedness, and in intellectual and cultural interests” (p. 55).

Scholastic Assessment Tests (SAT I) scores for college-bound high school seniors are
lower today than they were in the early 1970s (Zusman, 1999). Nearly 30 percent of college freshmen take remedial course in mathematics, reading, or writing, and even the most elite institutions spend substantial resources to offer them (Zusman, 1999).

The issue of declining student performance at the university level continues to be an area of great concern for many educators. But, increased government intervention in education, declining faculty expectations and the corresponding decrease in standards resulted in the decline in student performance and attitude in higher education (Spinelli, 1981). Spinelli (1981) indicated, “In attempting to accommodate underprepared and unwilling students, academic standards have greatly depreciated over the last 10 years” (p. 4). Mulka and Sheerin (1975) stated that the collegiate programs designed to remedy or compensate the academically handicapped have had less than desired results. Many institutions have recently asserted the need to emphasize the value of academic achievement. Students’ performance and attitudes may not immediately effect a change in higher education; however the education reform can begin to stress the need and desirability to achieve a high level of academic scholarship (Spinelli, 1981).

**Pedagogy.** The Carnegie Commission (1972) indicated, “The fourth Revolution set forth the view that the new technology should be encouraged because it can greatly enrich postsecondary education broadly defined; and also because it helps to bring in an alternative orientation to academic life” (p.5). Shulman (1987) proposed seven types that teachers could adopt: content knowledge, general pedagogical knowledge, curriculum knowledge, pedagogical content knowledge, knowledge of learners and their characteristics, knowledge of educational contexts, knowledge of educational ends, purposes, and values and their philosophical and historical grounds, and knowledge of
self. Technology is gradually transforming higher education and the work of the academic profession. There seems to be a widespread consensus in higher education that technology has the potential to revolutionize the teaching-learning process (Baldwin, 1998).

Green (1996) reported that growing numbers of faculty across all types of institutions and disciplines are employing a wide variety of technologies in college courses. He concluded there has been a steady migration of information technology into instruction since the early 1980s. This evidence supports that technology has entered the instructional mainstream. However, Green (1996) believed that instructional technology “has not radically transformed classrooms or the instructional activities of most faculty” (p. 28). Baldwin (1998) stated, “Many advocates of reform suggest that new technologies challenge professor’s roles because some aspects can be performed more effectively or efficiently using technology” (p. 10). Baldwin also indicated:

The array of information technologies in recent years has increased the scholarly power of professors. E-mail, fax machines, the World Wide Web, and CD-ROMs have greatly enhanced access to information sources and also increased the speed of information retrieval. (p. 11)

Gandolfo (1998) stated that “the new education reform’s concern is about the application of technology to the students and the traditional structures and pedagogies employed in the education of those students” (p. 25). In addition, Gandolfo pointed out, “technology has potential for improving instruction” (p. 29). Cathleen (2000) concluded that most students who take online courses have become engaged in the course and will learn more online technology. Students have more opportunities to initiate
communication with their instructors and other students. Education reform need to rely more on sound pedagogy in the design and delivery of online courses and helping students select learning strategies most appropriate to their individual circumstances (Cathleen, 2000).

Information technology. Burbules and Callister (2000) mentioned two overarching conditions of higher education in the United States are: (a) Transforming the structures and practices of higher education trends, and (b) globalization and the incorporation of new information and communication technologies into the knowledge activities of research, publication, and pedagogy. They pointed out, “Colleges and universities will change because of pressures from the outside... and technologies will be incorporated, in some ways and to some degree, in everything that colleges and universities try to do” (p. 281).

Burbules and Callister (2000) purported that the main trends for higher education are as follows: First, there has been an increase in online courses and programs in the United States educational system. Continuing education or distance education divisions in colleges and universities will be more integrated with the standard curriculum. Second, colleges and universities will need to find new ways to articulate the advantages of coming to campus. Third, higher education-business alliances and more coordination and even consolidation across college and university systems will be an advantage. Higher education-business compacts will result in colleges and universities contributing what they do best-providing interesting, quality content and teaching expertise-and businesses contribute what they may do better-marketing, promotion, job placement, and customer service. Fourth, the commercialization of higher education and online teaching could
result in what labor theorists have called intensification. This intensification in a neo-liberal policy context means pressures for standardization, accountability, efficiency, and top-down management from the public agencies that control many colleges and universities. Fifth, entrepreneurial models are beginning to be applied to teaching activities as well as research. Sixth, the analysis and critique of these new online pedagogies needs to go further. Seventh, these trends entail a reorientation of the kinds of legitimacy the contemporary college or university seeks for itself. (pp. 281-288)

Helping learners to identify educational quality and importance will need to be addressed as consumer-oriented models dominate educational policies.

Another researcher—vice president of academic programs for the International Space University, Pelton (1996) recommended universities and colleges need to keep pace with new technologies to remain relevant in the coming age of cyberspace education, interactive learning, and globalization of the learning process. Pelton posited the following 10-point program to intensify higher education and prepare it for the 21st century: (a) deregulate and introduce competition into education, such as: new tele education, cyberspace interaction, life-long learning, and adaptive or experiential education, (b) redefine learning, such as: instill concepts of teamwork, critical thinking, and continual learning in students, (c) embrace global educational systems, (d) eliminate credit hours and degrees, (e) reinvent academic research, (f) emphasize experiential learning, (g) use new educational technologies, (h) beware the danger of mega-training, (i) make higher education relevant to current societal needs, and (j) adapt to the coming era of the global brain. (pp. 18-20)

Information and research generally reflect the education reforms taking place

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in the United States (Pelton, 1996). The United States can serve as a model for access and lifelong learning. The impact of the shift toward entrepreneurialism will need to be further explored over the next decade.

**Successes.** Reformers of the first-wave believed that America's schools could search for educational excellence. Reformers of the second-wave realized that educational excellence would be unattainable without a restructuring of the enterprise itself. Reformers of the third-wave, having considered the implications of a restructured educational enterprise, were recommending that educational administration be once again more closely connected (Jacobson & Conway, 1990).

The change enabling the reform movements to go forward was the willingness of state leaders—governors, legislators, and business executives to take a more active role in education reform. The educational reform movement obtained considerable impetus from a series of national commission reports and privately funded studies that set the clear objectives and the agenda for the rush of reforms (Jacobson & Conway, 1990).

**Difficulties.** After examining a number of important undercurrents in contemporary education, each of the following may have a profound effect on the structure and organization of future American schools. These ideas include in the issue of teacher empowerment, school-based management, the changing politics of education, and the effects of electronic technologies. In order to represent these undercurrents clearly, the reformers will have to develop an appropriate role for university training in the preparation of America's future educational leaders (Jacobson & Conway, 1990).
Educational reforms have been taking place throughout the world not just in the United States. The following will illuminate the reforms that have been introduced in the United Kingdom, Australia, European countries and the Asian Pacific Regions.

*Educational Reforms of United Kingdom*

It is a necessity for researchers to know higher educational reform development in the United Kingdom or Great Britain in order to obtain a broader understanding of European countries' educational trends in recent years. All English universities except Oxford and Cambridge have switched from a traditional three-term academic year to the American system of two semesters (Gombrich, 2000).

In 1992 John Major's government passed a Further and Higher Education Act which brought dramatic change to higher education. Since 1965, British higher education had been organized on what was called the binary system, binary because it was divided between universities and other institutions, mainly polytechnics and teachers' training colleges (Gombrich, 2000). The degrees awarded by the polytechnics and teachers' training colleges were validated by the Council for National Academic Awards. The universities received grants from the government through a small body of academics, called the University Grants Committee (UGC); the UGC had considerable autonomy and the university had control over how to spend their grants, which until the late 1970s were given for five years at a time (Noble, 1999). Polytechnics, like state schools, were under local governments, which also gave them a more local character (Gombrich, 2000).

Gombrich (2000) stated that in 1992 the binary system was abolished and the many former polytechnics became universities, with corresponding changes in other areas of nomenclature, so that their executive heads became Vice-chancellors or
Principals and most senior teachers became professors. In Britain the title of professor is reserved for those who in America are called full professor, and a professorship is the same as a chair. There are 132 members of the Committee of Vice-Chancellors and Principals (CVCP), and all the institutions had to respond to a huge new bureaucracy called the Higher Education Funding Council for England and Wales (HEFCE). HEFCE and the CVCP jointly finance another body called the Quality Assurance Agency (QAA). Money for research also comes to the universities through the Research Councils, and, for science, from contracts with government and industry. It is important that the science research councils come under the government Department of Trade and Industry and are formally required to distribute their funds in such a way as to facilitate the creation of wealth; they have businessmen as chairmen and a substantial membership (Gombrich, 2000).

There is no free market competition in British higher education, but disjointed fragments of policy have introduced certain competitive elements. Each year every academic has to fill in a form of self-appraisal. The Research Assessment Exercise (RAE) is nominally just that, an assessment of how good university departments have been over the past few years at producing research (Gombrich, 2000). Each academic is invited to submit up to four publications for assessment. University administrators require their staff to submit four publications and that if they do not they may be invited to take early retirement. Universities are credited with the research of the staff they employ at the time of the assessment, regardless of where that research was done. Thus, people with good publications are hired for the year of the assessment and then let go (Gombrich, 2000).

It is apparent that pressure on the professoriate not only to teach and do research
but also to attract external grants, do consulting, and the like is great (Altbach, 1991). British academics that entered the profession after 1989 no longer have tenure but are periodically evaluated (Gombrich, 2000). Gombrich (2000) reported that British higher education policy over the last twenty years has been an unmitigated catastrophe. The speed with which they were attempting this change was one of the reasons for the negative result they experienced (Gombrich, 2000). Gombrich (2000) indicated that in Britain teachers had a strong bias towards vocational and applied subjects, and their teaching faculty were not expected to publish research, though they were certainly not prohibited from doing so.

Britain’s basic higher educational system is similar to Taiwan, which has also adopted the binary system. The role of the professor, as well as, the pressure on the professoriate has increased with the implementation of the new reforms in Taiwan since 1996 and tends to mirror the British reforms.

Educational Reforms of Australia

Australia’s higher education institutions began significant reforms according to Mahony (1994) when the binary system evolved into the Unified National System. This new system transformed former colleges of advanced education into universities. Dawkins energetically led the higher education reform movement in Australia from 1987 to 1992, during his period as federal minister for employment, education, and training (Mahony, 1994). Concerns about higher education and economic advancement led to these areas being set as national priorities: computer science, engineering, accountancy, and business studies, teacher education in science and mathematics, and (because of regional proximities) Asian languages, and studies (Mahony, 1994).
This former binary system of some forty-seven Colleges of Advanced Education (CAEs) and nineteen universities was transformed into the United National System of thirty-five universities. One of the positive consequences of the changes in higher education initiated by John Dawkins in 1987 was an increased emphasis on outcomes and a growing consciousness of the importance of institutional efficiency and effectiveness (Dawkins, 1988).

Karmel (2001) supported the abolition of the binary divide in higher education in 1988, which resulted in a doubling of the number of universities, and the subsequent large increase in enrollments. There were concerns about the quality of the universities and therefore they established the Committee for Quality Assurance in Higher Education (CQAHE). Universities were given grades and rewards for good performance. The Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) endorsed the establishment of the Australian Universities Quality Agency (AUQA) as an independent body to conduct quality audits of higher education institutions on a five-year basis (Karmel, 2001). Deciding how to define the quality of research activities or community services raised an equally large range of issues. Universities have been under pressure for some time to improve efficiency. Kemp (2000) stated that professor productivity has certainly risen substantially over the past decade due to these education reform measures.

Generally, Great Britain (Gombrich, 2000) and Australia (Mahony, 1994) have seen some negative results and conflicts when they rapidly attempted to merge their binary system of technical vocational institutions and universities into a sole university system. In Britain and Australia, universities have become cost centers, and
accountability has been pushed to its logical extreme (Altbach, 1991). Educational reforms have reflected the philosophy of cost effectiveness emulating the business arena. Quality of education is still being defined and evaluated primarily on quality audits.

_Educational Reforms of European countries_

Reform was greatest in several traditional Western European academic systems. For example, Sweden’s universities were completely transformed: decision making was democratized, universities were decentralized, educational access was expanded to underserved parts of the country, interdisciplinary teaching and research was instituted, and the curriculum was expanded to include vocational courses (Altbach, 1991). Altbach (1991) also indicated some European countries’ students demanded far-reaching reforms in higher education, especially an end to the rigid, hierarchical organization of the traditional European university. The chair system was modified or eliminated, and the responsibility for academic decision-making, formerly a monopoly of full professors, was expanded in some countries, to include students (Altbach, 1991). At the same time, interdisciplinary teaching and research changed the traditional academic disciplines.

Reforms also took place in France and the Netherlands, where reformers stressed interdisciplinary studies and the democratization of academic decision-making. In Germany the universities in states dominated by the Social Democratic Party were also reformed, with the traditional structures of the university giving way to more democratic governance patterns (Altbach, 1991). In fact, some reforms in governance that gave students and junior staff a dominant position in some university functions were ruled unconstitutional by German courts (Altbach, 1991). These changes have caused the universities’ autonomy to shrink, and administrative structures have been put into places
in such countries as Britain and the Netherlands to ensure greater accountability from the university (Altbach, 1991).

The major trends in restructuring European universities have included changing Britain’s and Australia’s binary systems, funding of research, an increase in the number of universities, and parallels mirroring American educational system reforms. Concerns in the quality of education were raised in Britain, and Australia. In addition, these countries also were concerned about administrative efficiency, accountability and shared control over educational enterprises.

Educational Reforms of the Asian Pacific Regions

The review of the literature would be incomplete without attention being paid to regions in the Asian Pacific that have the same language and cultural background with Taiwan and have experienced educational reforms. The two regions addressed are Mainland China and Hong Kong.

Mainland China

In more recent years, the Chinese Communist Party (CCP) has endorsed the socialist market economy with a primary focus on opening up the mainland in order to make the Chinese economy more prosperous. It is in such a relatively open socio-economic and political environment that different marketing strategies have been adopted or allowed to run higher education in the mainland (Mok & Lee, 2001). Therefore, the recent marketization and decentralization projects in Mainland China are generated from the fundamental transition to the socialist market economy and educating people to that economy. A direct result of these economic changes is the need for changes in higher education to reflect this philosophy (Mok & Lee, 2001).
The higher education reform was started in the mid-1980s when the CCP had attempted to create more opportunities for people to participate in higher education (Mok & Lee, 2001). After the Cultural Revolution in the mid-1970s, China’s educational institutions lacked qualified staff and appropriate curricula, resources and facilities. Therefore, the China government decided to borrow knowledge, techniques and technologies from the West. Teachers were brought into universities from overseas to provide assistance to Chinese educators and students to access learning from the West. After a few years of restoration and consolidation, higher education reforms were scheduled with the central focus on decentralization and marketization (Mok & Lee, 2001).

In Mainland China, university autonomy is defined not only as a form of power or control, but also as an art of using this power for universities to continue their historical mission of serving society within the framework of government policies (Zhong, 1997). University autonomy in China is based not only on the Chinese intellectual tradition, but also on aspects of the Chinese experience of learning from the west (Zhong, 1997). University autonomy in China can best be understood in relation to Chinese culture. Its intention is determined by several factors, including the political influences on the goals of higher education throughout China’s history, the intellectual tradition in the pre-modern period, development patterns of Chinese higher education in the modern period and the economic and political changes in the reform period (Zhong, 1997). University staffs are creating situations for a greater freedom of action on their own parts (Zhong, 1997).
China imported Western models and adapted them in their public education system to meet local needs and conditions (Altbach, 1991). China has also established a private higher education system. Private initiatives in higher education bring a change in values and orientation, but it is not clear that these values will be in the long-term best interests of the university (Altbach, 1991). Educational reforms are continuing in Mainland China. The educational reform will continue to support China's economy becoming more prosperous through marketization and decentralization projects (Mok & Lee, 2001).

Hong Kong

Hong Kong was a British colony up to 1997. Hong Kong University was established to foster trade with China. Hui (1998) stated, "The colonial government resisted demands for higher education in order to control social mobility" (p. abstract). Even though the economy grew remarkably before 1984, only two percent of the age-cohorts had access to higher education (Hui, 1998). Just before Hong Kong's reversion to China in 1997, the colonial government initiated expansion in higher education by building a new university, transforming private colleges to public-funded universities, and shortening the degree program of the Chinese University from four-year to three-year in order to maintain a British academic model in Hong Kong (Hui, 1998). Hong Kong considered reforming the higher education system to meet its political and economic needs for the 21st century after they reverted to being governed by Mainland China (Hui, 1998).

In 1997 when Hong Kong reverted to the government of Mainland China, a major goal was undertaken to increase the number of participants in higher education. Mok  

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(2000) indicated that within five years higher education institutions in Hong Kong had tripled student population. He also stated that because of the relatively short period of time this increase took place there was some concern about quality assurance in the education being offered.

Mok and Lee (2001) indicated that the government and the University Grants Committee (UGC), the organization responsible for decision-making and monitoring of higher education in Hong Kong, have put more emphasis on achieving greater value for money and improving the quality and cost-effectiveness of universities and other higher education institutions. In addition, the government of Hong Kong Special Administrative Region (HKSAR) has a strong belief in the importance of a learned society, therefore another wave of higher education expansion was proposed in 2000, which set as a goal doubling the number of higher education graduates in the next ten years (Tung, 2000). Mok and Lee (2001) reiterated that evaluating the quality and resource issues is becoming increasingly significant in higher education governance in the Hong Kong Special Administrative Region due to the exponential increase of students in higher education.

*Educational Reforms of Taiwan*

The recent reforms in the university education system have centered on 'academic self-determination' and 'university independence'. Universities and colleges now have the right to determine their own personnel; administrators such as presidents, deans and department heads are elected or appointed according to a variety of methods in each university, as opposed to past practice when the Ministry of Education (here after referred to as MOE) had sole authority to appoint presidents and deans of public universities and
colleges. Universities have more authority in determining the rank and qualifications of instructors than in the past and universities are gradually being authorized to examine the quality of instructors. Thus, university education has become more open and liberated (The MOE, 2001, May).

Educational reform is the power that promotes the development and progress of education. Educational reform has become an important subject which both the government and the higher education system are doing their best to implement. The Ministry of Education (2001, May) indicated that by ‘educational reform’, the educational system must accept new educational concepts, revise curricula contents, adopt new pedagogical processes to correct the potential faults of educational reform. When society changes drastically, it is urgent to redirect future educational development.

The Ministry of Education (2001, May) also demonstrated that in the program of ‘Pursuing Excellence in Higher Educational Development’ it is the responsibility of higher education to guide social development, to cultivate higher level experts and to enhance the national competitive capability. With the purpose of improving higher education, the Ministry of Education has carried out several projects. First, a ‘University Law Amending Group’ has been established to check the problems resulting from the implementation of the University Law, and to hold public hearings in various regions to gather different opinions. Second, the present structure of the Academic Examination Committee of the Ministry of Education will be adjusted as a Higher Education Examination Committee. Third, universities are encouraged to promote the evaluation system for instructors and the evaluation of basic subjects within the institution. Professional institutes will carry out the evaluation to maintain and elevate the level of
higher education, and promote a multiple evaluation system (The MOE, 2001, May).

The Martial Law was lifted in 1987. Yang (2001) pointed out that democratization, pluralism and liberalization have hence been sought for in every socio-cultural sphere. Reform in education has been crying out for meeting the demand of the changing social reality. Since the early 1990s a popular sense of educational crisis has resulted in the feeling that the system must make major changes. It was these circumstances calling for drastic action that led to the premier’s approval for the establishment of a cabinet-level Council on Education Reform in September 1994 for restructuring the educational system to meet the new demands of the coming century. After a two-year study, the Council published the General Consultation Report for Education Reform on December 2, 1996 (Council on Education Reform, 1996). The mottos interwoven in the General Consultation Report for Education Reform are deregulating governmental control over education and exempting education from unnecessary constraints, safeguarding the students’ learning rights, protecting the parents’ choice right of education patterns and respect for the instructors’ professional autonomy (Yang, 2001). Since the Executive Yuan has set a time limit for implementing the Reform Mandates within five years, the Ministry of Education and the related Educational Authorities immediately took coordinated initiatives to revise the existing laws and to enact new laws. Among these pieces of legislation, the revised University Law, the Teacher Education Act, and the Law of Teacher Union and Teacher Selection are thought to be particularly significant in restructuring the education system in Taiwan (Yang, 2001). So far as the revision of University Law is concerned, it launched an accelerated process of educational liberalization and deregulation (Yang, 2001).
Yang (2001) indicated that the new University Law has reduced the centralized power of the Ministry of Education over universities and colleges, and consequently the campus operations have become more flexible. New systems of selection and/or election of academic chiefs (department heads, deans and university presidents) have replaced the old system, where deans and department heads used to be appointed by university presidents, and university presidents by the MOE. The Education Basic Law in 1999 provided that the central government must delegate more authority to local administrations in handling education (Yang, 2001). The Law also requires educational authorities to remain neutral when giving instruction on the subjects of politics and religion. Educational authorities are not allowed to force students, instructors or staff members to participate in political and religious activities, or to promote political or religious groups. The Education Basic Law is paving the way for the implementation of numerous education innovations in Taiwan (Yang, 2001).

The introduction of market mechanisms into the educational process has forced governments to reduce their control over education (Yang, 2001). In order to examine the effectiveness of implementation for the educational reform, the Ministry of Education has been holding a series of discussion, meetings, seminars, conferences since May, 2001, inviting professors, academic researchers, schools, and parents in order to announce the evaluation results to the public, and propose the future direction of educational efforts (The MOE, 2001, May). The discussion was based on the evaluation and assessment of the content and procedure of the educational reform in order to elicit the best therapy to remedy the disadvantages of educational reform. The Ministry of Education (2001, May) indicated that self-reflection, and response to indicated changes, are an essential part of
responsible performance by policy making authorities. What this means practically is the Ministry of Education’s has continued its openness to new input regarding the effectiveness of the reform policies.

The Ministry of Education was designing and moving technological and vocational education to be multi-purposed, with specialized professional development in a variety of technical areas. These measures have had very desirable results, and earned great appreciation along with an increase in perceived status from Taiwan’s society. However, owing to the rapid change in the social educational environment, reform also produced some obstacles during the implementation process. In order to solve these problems, the Ministry of Education held meetings with concerned groups both inside and outside of the MOE to discuss them in order to overcome them (The MOE, 2002, October). After having discussions, the Ministry of Education (2002, October) realized that some problems needed to be corrected. First, it was an urgent necessity to differentiate the overlapping status and function between Comprehensive Universities and Institutes/Universities of Technology. Second, student employability was problematic, namely there were some difficulties with innovation and competition occurring in the industrial field. Third, the match between graduates and employer needs is not good. There are different needs between schools’ curricula and practical requirements in the industrial field. The teaching quality should be improved in order to upgrade students’ employability (The MOE, 2002, October).

Education reform continues to attract higher attention during the past year, including some expectations and queries from Taiwan’s society as well (The MOE, 2003, April). The Ministry of Education (2003, April) announced that they will definitely
conduct appropriate implementation and revise every aspect in order to improve the education reform policy, and eliminate the obstacles that happened during the implementation process. The Ministry of Education (2003, April) indicated that the educational reform is over-idealized and neglects the real social needs and public acceptance by society. However, the Ministry of Education has realized their needs for a broader range of input, “the government should pay more attention to varied voices in a positive manner, plan well and make appropriate adjustments” (The MOE, 2003, April). The Ministry of Education (2003, April) decided on a ‘Simple, Fair, Multifunctional’ measure for making improvements to educational reform.

Shen (1998) and Huang (2000) emphasized the importance of systematic education reform evaluation. They were also concerned about how to establish an effective evaluation mechanism. Yang (2000) stated that the educational administration has to face difficulties and challenging issues, and consider adjustment measures deliberately. He also indicated that establishing a mechanism of appropriate evaluation and effective feedback first will lead efficiently to the achievement of education reform objectives. Yang suggested that suggestions had best go through communicative channels from society to the educational administration for reference and then sent for policymaking revisions. Yang strongly indicated that school leaders or governmental educational administrators should listen to the voices from instructors, parents, and/or students in order to submit objective and concrete results to the related educational department.

The Ministry of Education has already held a national educational meeting in September, 2003 to further discuss these reform measures (The MOE, 2003, April). The
Ministry of Education will continue to evaluate educational reform and additionally, plan a blueprint of national educational development to look forward to creating a wonderful prospect for Taiwan's education of future (The MOE, 2003, April).

**Technological and Vocational Education**

Technological and vocational education has always played an extremely important role in the economic development of Taiwan. In the 1950s, the teaching of entry-level competency at the junior high school level ensured there was sufficient manpower to meet demands of industry. In the late 1960s, senior vocational schools were developed, and junior colleges were established with the purpose of cultivating entry-level and mid-level technical and managerial skills (The MOE, 2001). By the early 1970s, the first institute of technology was founded to offer senior vocational school and junior college graduates opportunities for further education (The MOE, 2001).

**Present status.** At present, technological and vocational education in Taiwan is provided at three levels, senior vocational schools, junior colleges, institutes of technology or universities of technology. In addition, a project is currently under way to provide technical programs at the junior high school level. At the upper-secondary school level, an experimental program of comprehensive education, which includes vocational programs, has been conducted. The junior college system is divided into two types, two-year and five-year programs. Institutes of technology or universities of technology have undergraduate, master, and doctoral programs. Undergraduate programs are two-year and four-year, and are also open to individuals in the workforce (The MOE, 2001).
In 1996, calls for educational reform came from various academic groups. In order to improve access to further technological and vocational education, the second education avenue (senior vocational school-junior college-institute or university of technology), paralleled with the avenue of senior high school to university was created (The MOE, 2001).

Thus, construction of more national institutes of technology and junior colleges was planned, and private endowments were being encouraged (The MOE, 2001). Junior colleges were to be upgraded to institutes of technology while retaining their junior college programs which were required to maximize university resources. The two-year system at institutes of technology is to be encouraged in order to expand study opportunities for people currently employed. Changes were made to regulations to encourage the establishment of university branches, so that institutes of technology would become universities of technology offering comprehensive university education with an emphasis on practicality (The MOE, 2001). Consequently, a comprehensive technological and vocational education schooling system (senior vocational school-junior college-institute or university of technology) was fully established (The MOE, 2001).

In order to upgrade the quality of highly skilled technicians to meet the requirements of the developed countries in the future, the Taiwan Ministry of Education set an innovative policy on HTVE reform system. A ‘Junior College Upgrading Policy’ was announced in 1995 (The MOE, 2001). Since then, many formal two-year, three-year and five-year Junior Colleges started to apply for upgrading to a higher level named as Institute of Technology, the first stage, and then to a University of Science and Technology, the second stage. This two-stage process was set for either an Institute of
Technology or University of Science and Technology to meet different requirements, which were set and evaluated by an organized committee of Ministry of Education (The MOE, 2001).

Traditionally, a two-year program of junior colleges accepts graduates who have passed a Joint Examination from vocational senior high school, while five-year junior colleges accept graduates who have passed the Joint Examination from junior high school. Those two-year, three-year and five-year junior colleges offer Baccalaureate degrees (associate degree) while all new upgraded four-year Institutes and Universities of Science and Technology offering the bachelor degree. This was one of the most important reasons to convert conventional junior colleges to degree-granting institutions as soon as possible.

By 1994, there were six Institutes and 72 junior colleges, but no Universities of Science and Technology. After the massive educational reforms, the number of junior colleges decreased to 53 in 1998 and 19 in 2001 respectively (The MOE, 2001).

The conversion from junior colleges to either Institutes of Technology or Universities of Science and Technology was slow at the beginning but within six years, at least 60 junior colleges were converted into four-year Institutes or Universities of Science and Technology which accept the secondary and vocational high school students (The MOE, 2001).

There are 83.3% junior colleges being upgraded to Institutes of Technology and then Universities of Technology. The total number of enrolled students at junior colleges decreased from 316,963 in 1998 to 107,121 in 2001, while students at Institutes grew from 227,245 in 1998 to 460,581 in 2001 (The MOE, 2003).
After 1998, most new Institutes were seeking to move to the second stage and be promoted to Universities of Technology. In this system, Universities of Technology can set up graduate schools and various advanced programs, which attract most Institutes' students. Some well-known departments or special programs of Universities of Technology can attract many high school graduates from the conventional university systems. The system emphasizes job-oriented teaching programs, which attract people who wish to be employed in specific fields. Its flexible teaching programs also offer evening or weekend programs for the person who works. This is totally different from the conventional educational system and is welcomed by most adult students.

During an economic recession, students prefer taking a program offered by a University of Technology instead of a conventional university system because it is easier to find a job upon completion of training and education. In addition, Universities of Technology offer advanced graduate programs, which is why many students switched from the traditional four-year university to the University of Technology system. The total number of University of Technology institutions has increased up to 22 as of 2002 (The MOE, 2003). The number of University of Technology units is growing after successfully upgrading to Institutes of Technology and now moving to Universities of Technology. Theoretically speaking, Taiwan will have had more than seventy Universities of Technology when all junior colleges complete the conversion to the Universities of Technology, which is almost the same number of conventional four-year universities now in the system. Without question, this is the largest comprehensive change to the educational system that Taiwan has ever seen.
**Future prospect.** Since the lifting of the martial law in 1987, the Taiwan government has started to review and reform its higher education system. The review of the educational system was started in mid-1990s (Mok & Lee, 2001). Mok and Lee (2001) pointed out that after the review, the government focused on internationalizing Taiwan's higher education. This internationalization encouraged Taiwan to establish links and academic exchanges with universities overseas. In addition, the Taiwan government has attempted to introduce reform measures to improve the efficiency and effectiveness of its higher education, particularly in terms of financing the education system, changes in funding the system and new management strategies (Tai, 2000).

With these reforms, the educational relationship has been redefined. The government introduced a policy of privatization in education. This act reflected the revitalization of the private sector and the mobilization of national-wide resources to run education. Privatization alleviated the pressure of the government to meet the requirements for higher education (Mok & Lee, 2001). In addition, Mok and Lee (2001) pointed out that the rapid expansion of private higher education in Taiwan has caused the concern for improving the quality of higher education. The recent reform initiatives attempting to promote quality assurance can be seen as the strategy of the government to ensure the quality of higher education (Weng, 2001).

**University Circumstance**

The current university and college education system consists of traditional universities and technological universities; while the functions of the former include teaching, research, service and extension, with an emphasis on research and teaching, the functions of the latter emphasize technological education and research. Each of these two
categories has its own characteristics and specific functions in educational goals, course design, and student guidance (The MOE, 2001).

Since the last decade, higher education enrollment has been expanding in Taiwan. In the 1950s, there was approximately one per cent of the population who could enjoy higher education (The MOE, 2001). With the lifting of the martial law in 1987, coupled with the improved socio-economic conditions and accumulation of wealth resulting from the increased economic wealth in the last few decades, people in Taiwan became more concerned about the quality of education and the need for higher education. By the late 1990s, there were around seventy per cent of secondary school graduates who were admitted to the higher education sector (The MOE, 2001). The process of massification, together with rapid changes that resulted from the domestic and global pressures caused the Taiwan government to reform its higher educational system. Mok and Lee (2001) stated that since the late eighties, Taiwan's higher educational system has experienced the process of denationalization, decentralization, autonomization and marketization (Mok, 2000a). Mok and Lee also pointed out that the expansion of the civil society, the autonomization process taking place in the higher education, along with the pressures and changes generated by the growing impact of globalization, have become driving forces to initiate higher education reforms by the Taiwan government (Mok & Lee, 2001).

Mok and Lee (2001) indicated that the fundamental changes in Taiwan's higher education sector since the late 1980s through the popular processes of decentralization and autonomization, but the idea of song-bang (liberalization or autonomization) did not mean the withdrawal of Taiwan government in the educational domain. Even now under educational decentralization, the Taiwan government is still the major provider of
educational services (Mok & Lee, 2001). The government has tried to redefine the status of higher education. The revised University Law stipulates that all national universities will become independent legal bodies and hence they are accountable to the public. All universities are required to run their own financial business independently. The Taiwan government’s plan is to gradually reduce its subsidy to these public universities. The proposed changes will inevitably transform the way universities are financed, regulated, and managed (Weng, 2001).

In conclusion, there are many changes in common in the higher education sector in Hong Kong, Taiwan, and Mainland China, which indicates that higher education developments in these three societies have been affected by the similar trends of decentralization and marketization (Mok & Lee, 2001). Educational decentralization is a popular reform of governments around the world even though there were diversified strategies and outcomes that different countries have conducted (Hanson, 1998). Mok and Lee (2001) compared and contrasted educational developments in Asian Pacific region, with particular attention given to examining the relationship between increased globalization and educational reforms. After completing a series of comparative studies, they found that educational developments in the region, including Hong Kong, Taiwan, Singapore, South Korea, Mainland China, Japan, the Philippines, Cambodia, New Zealand, Australia, have been affected by the trends of marketization and corporatization (Mok & Lee, 2001). It is noteworthy that with economic downturn in the recent years, particularly after the East Asian financial crisis and the September 11, 2001 terrorist attacks in the United States of America, the economy of the whole region has been badly affected (Mok & Lee, 2001). Governments in these societies are increasingly concerned
about the role of education in improving their international competitiveness, and their place in regional and global markets. Furthermore, these governments wish to promote the idea of life-long learning and quality education in preparing their citizens for the knowledge-based economy (Mok & Lee, 2001).

**Impact**

Another facet that is important is how these rapid and dynamic reforms change the academic role of Taiwan instructors. The faculty role and those adjustments made to accommodate these educational changes are discussed in the next section.

*Academic role of faculty.* The appropriate balance between teaching, research and service in academe is one of the main critical debates in the academic profession (Altbach, 1999). Existing studies point out that overall faculty productivity at the institutional level has been maximized and that attempts to reconfigure the faculty role harm the existing balance among competing facets of the academic role (Olson, 1994). Milem, Berger, and Dey (2000) indicated that public sentiment posited by Bok (1992) and empirical evidence acclaimed by Dey, Milem and Berger (1997) suggested that the faculty role is changing and publication productivity is becoming an increasingly larger consumer of faculty time and energy. Olson (1994) indicated that there are technical and institutional constraints on improving overall productivity. Dey, Milem and Berger (1997) found that publication productivity has increased for all institutional types over a twenty-year period. It becomes clear that how changes in the requirement for research affects productivity in teaching and advising.

American professors seem to be working longer, and classroom hours have not decreased in recent years (Altbach, 1999). A change in thinking has taken place with
regard to research and its role, including preparation, student advisement, an orientation toward more applied research, a closer connection between industries and universities, and more services to the private sectors (Altbach, 1999). Regardless of espoused institutional mission, Fairweather (1993a) found that research is rewarded more than teaching. He indicated that higher education is moving increasingly toward a single reward structure for all types of institutions and programs. Altbach (1999) indicated that "In some ways, academics have moved closer to their clientele through the emphasis on service to external constituencies" (p. 284). Fairweather (1993b) found that department chairs in liberal arts colleges are more likely to value teaching than their counterparts in research I and II institutions as designated by the Carnegie classification.

While much of the literature focused on teaching and research as the primary concern in which faculty spend their time, there is evidence that the amount of time faculty spend with students outside of the classroom affects time spent on research and teaching (Milem, Berger, & Dey, 2000). Massy and Zemsky (1994) observed the time spent with students outside of the classroom is one area that suffered because of the amount of time required for research and teaching. Bowen and Schuster (1986) demonstrated that although the faculty has become more concerned over time about teaching and research, and the perception among administrators is that faculty is becoming less concerned about advising students (Bowen & Schuster, 1986). Moreover, faculty workload continues to center around the issues of time spent on research versus time spent in the classroom (Cage, 1991). There is evidence that faculty contact, formal and informal, is an important part of the educational process (Astin, 1985). An effort in higher education is to convince academic institutions and the professoriate to think more directly about student needs (Altbach, 1999).
Milem, Berger, and Dey (2000) indicated, “Most studies investigating how faculty-members divide their time among their various academic responsibilities have focused on the trade-offs between time allocated to the research role versus time spent on teaching activities” (p. 458). Milem, Berger, and Dey (2000) concluded that generally, three types of relationships—no conflict, conflict, and compliment—have been specified between teaching and research. The no conflict perspective assumes that teaching and research are unrelated and that the roles are independent of each other, one having no effect on the other. The conflict perspective contends that teaching and research are negatively related to each other. The complimentary perspective views the teaching and research roles as being positively related to each other. Reviews of existing studies in this area have provided mixed results for all three perspectives, with the no conflict or compliment perspective generating the strongest, but not conclusive support (Feldman, 1987; Braxton, 1996).

Milem, Berger, and Dey (2000) stated that in a cross-sectional examination of the quantity and quality of faculty work are important on faculty’s time distribution. Bowen and Schuster (1986) found that faculty in the science, engineering, and social sciences at universities spent roughly fifty percent less time on instructional activities than their colleagues at other types of institutions. They also noted that faculty at universities spent three times the amount of time engaging in research than do their non-university counterparts. These findings clearly support the idea that institutional type influences the nature of professional time allocation by academic members (Bowen & Schuster, 1986).

It is important that schools consider different ways faculty spends their professional time indicating conflicting views about changing patterns of faculty time use.
While many reformers of higher education maintained that faculty were spending less time in teaching-related activities (Massy & Zemsky, 1994), other educators provided evidence which suggested that faculty were spending as much time as ever in work related to the teaching role (Bowen & Schuster, 1986). Empirical evidence shows that faculty are becoming more productive in their research efforts over time (Dey, Milem, & Berger, 1997). Given the importance of faculty advising students required by the Taiwan educational reforms, and the controversies regarding what percentage of effort should be allocated for teaching and research is an important aspect to be considered because all three measures-teaching, research, and counseling/advising—are important.

Milem, Berger, and Dey (2000) stated that scholars have been interested in the factors affecting the way individual faculty members, departments, and institutions divide the various responsibilities associated with the faculty role. It has been noted that external forces exert opposing pressures on faculty at the institutional, departmental, and individual levels to spend more time on either teaching or research (Braxton & Berger, 1996). State legislators and public opinion frequently mandate that faculty focus on teaching, whereas patrons of research (e.g., private industry and foundations, federal research organizations) promote and reward research activity and productivity. The evidence that faculty at all types of institutions are becoming more productive in terms of publication (Dey, Milem, & Berger, 1997) causes a growing concern regarding the accountability of faculty time (Massy & Zemsky, 1994) because it may negatively impact time spent in advising, teaching, and community service.
Faculty productivity. Many non academies have argued this issue. Altbach (1999) indicated, “There should be more emphasis on teaching in the American higher education system. It is agreed that research is overvalued and that, especially considering fiscal constraints and demands for accountability, professors should be more productive” (p. 283). Research accomplishment, the most cosmopolitan of academic functions, has social and economic value, and enhances institutional calibre among peers (Alpert, 1985). Political and public support for academic institutions, however, rests on the perceived institutional commitment to local functions, especially teaching and learning (Ewell, 1994). In the United States legislative calls for accountability and effectiveness, and public concern about increasing costs and the potential contrary consequences clearly focus on the teaching mission (Fairweather, 2002). Many state legislatures have emphasized faculty commitment to teaching often in terms of instructional productivity (Fairweather, 2002).

The inattention to teaching and learning, particularly at the undergraduate level, deserves considerable attention (Bok, 1992). Boyer (1990) acknowledged the legitimacy of this claim when he attempted to encourage institutional responsiveness to public concerns about teaching and learning. He suggested that teaching should be considered a form of scholarship in order to increase its status on college campuses (Boyer, 1990). Fairweather (2002) stated that the American Association of Higher Education Forum on Faculty Roles and Rewards encourages institutional teams to foster changes in local faculty rewards for teaching.

Blackburn and Lawrence (1995) found that the most important factors in faculty research productivity were demographic characteristics. They also found that other
behaviors including external research funding had an impact on faculty productivity. In other studies of faculty teaching and research, Fairweather and Rhoads (1995) and Diamond (1993) found rewards, not socialization and attitudes, to be the strongest correlate of faculty behavior. Fairweather (1996) advocated the belief in the teacher-scholar rests on the following tenets:

(a) Teaching and research are seen as mutually reinforcing. From this perspective, the best scholars are the best teachers, (b) the best teacher is a scholar who keeps abreast of the content and methods of a field through continuing involvement in research and who communicates knowledge and enthusiasm for a subject to students. (p. 100)

Feldman (1987) examined the theoretical bases for believing that research and teaching are mutually reinforcing behaviors. Linsky and Straus (1975) indicated that faculty who conduct research are more likely to introduce research-based material into their classroom instruction. Feldman (1987) found little relationship between student ratings of teaching excellence and various forms of research productivity. Hattie and Marsh (1996) found a negative relationship between faculty time allocated to teaching and time allocated to research. In America, attention to faculty workload and productivity is a growing trend (Altbach, 1999). Layzell (1996) has reviewed the literature on faculty workload and productivity and found that heavier workloads resulted in less productivity. Other studies support Layzell’s finding on the reverse relationship between workload and productivity (Francis & Schiele, 1996; Vasil, 1996).

In contrast, Colbeck (1997) found that teaching and research activities can overlap. Fairweather (2002) indicated that “Research is much more likely to overlap with
independent study instruction or dissertation committee work than it is to influence classroom teaching” (p. 29). Hattie and Marsh’s (1996) analysis did not find a relationship between teaching effectiveness and research productivity because they focused on only one aspect of the instructional work such as the classroom instruction. They reported, “...the common belief that research and teaching are inextricably intertwined is an enduring myth” (p. 529). Fairweather (2002) stated, “The belief that the typical faculty member can simultaneously achieve high or at least above average levels of productivity in both research and teaching is largely unexamined” (p. 29). Fairweather (1996) focused on time allocation and rewards rather than on specific measures of productivity.

Other than hiring new faculty members, the principal expression of academic values about faculty work lies in the promotion, that it would like the faculty to seek ideas about the value of different aspects of their work (Fairweather, 2002). It may relate to how instructors in Taiwan view the worth of their work. Productivity is most meaningfully when defined and evaluated. Promotions are actually private in nature. It is difficult to identify the cumulative effects of individual decisions within an institution or to identify patterns across types of institutions and disciplines (Fairweather, 2002). Fairweather (2002) asserted that each faculty member is expected to be simultaneously productive in both teaching and research.

Taiwan educational reforms were activated in 1996, emphasizing that both teaching and research are important. Crimmel (1984) pointed out that the teacher-scholar represents the ideal in American higher education. Finkelstein (1984) indicated that this ideal is purportedly perpetuated in the socialization and psychological predisposition of
faculty members to pursue both teaching and research. Blackburn and Lawrence (1995) epitomized the perspective of faculty productivity. They placed the greatest emphasis on self-knowledge, which includes personal commitment, efficacy, psychological characteristics, satisfaction, and morale. According to Blackburn and Lawrence (1995), it was social knowledge, which includes social support, perceived institutional preference, and institutional values. Environmental influences had a tertiary role (Fairweather, 2002).

Education reform is sweeping the globe in varying and deliberate ways. Accompanying these dramatic shifts in traditional methods of educating are the responses that those who are affected by these changes are exhibiting. As Machiavelli cited in Gilbert (1965) stated, “there is nothing more difficult to carry out…than to initiate a new order. The [reformer] has enemies from those who would profit by the old order, and only lukewarm support from those who would profit by the new order” (p. 26). Change is complex and difficult to implement and thus in an era when nothing is more certain than change some elucidation of this topic is warranted. The following section will offer some understanding of the topic of change.

Change Phenomena

Intellectually, people may acknowledge the need for change, but emotionally they may not be ready to deal with it until a serious event causes them to face up to the changes that occurred (Tichy & Devanna, 1986). Koehler and Pankowski (1997) indicated:

Challenges for leaders have never been greater…. The call for change is especially true for leaders in government…. Clearly, there is a need for change in the way government is administered and managed that will regain the public’s trust.

Fortunately, there are fundamental methods and strategies that can accomplish
these needed changes. They are fundamental in that the traditional bureaucracies, which stifle innovation and change, must be replaced by systems that encourage and empower every worker, from top to bottom, to create the smaller, more efficient and responsive government demanded by its owners-taxpayers.

One of the most difficult changes for American organizations during the past decade has been to shift from top down management systems to ones that empower the work force. Although many organizations have given lip service in the past to the importance of respecting the opinions of workers, American managers often found it very difficult to trust the wisdom of subordinates. Government administrators have found this transition to be even more difficult, in that external forces have not dramatically affected change. (pp. vii & viii)

We live in a time when change is swift and often abrupt. Technology changes so quickly that even people and organizations that have made it their business to change sometimes fall behind. Organizations and people who hesitate slightly can fall far behind in a short period of time.

One of the most useful model of organizational changes was developed by Kurt Lewin (Koehler & Pankowski, 1997). Lewin (1951) suggested that there are two sets of forces acting on peoples’ behaviors. One set of forces pushes for change while the other set of forces resists change in favor of the status quo. Lewin indicated that change requires three steps. First, unfreeze the culture by making people aware of the weakness in their current conditions. Second, unfreeze the culture by persuading organizational members that the current organization culture will not achieve desirable outcomes. Lewin referred to the second step as the organization changing, or an organization in transition.
He indicated that it is during this transition that associates embrace new beliefs, values, and attitudes towards the organization and its customers. It is during this phase that transformational leaders use various interventions to move the organization in the desired direction. New work methods, management systems, structures, strategies, and technology are introduced to help associates adapt to change. The third and final step in Lewin's model of change is the process of refreezing, where the changes become institutionalized. Transformational leaders are creating a climate that is open to change, as well as, they are constantly adjusting their organization by making continual improvements. Leaders then are creating cultures where attitudes and behavior continually contribute to organization change.

**Institutionalizing Change**

Tichy and Devanna (1986) stated:

Revitalization is just empty talk until the new vision becomes reality. The new way of thinking becomes day-to-day practice. New reality, actions, and practices must be shared so that changes become institutionalized.... Major transitions unleash powerful conflicting forces in people, and individual psychodynamics of change must be understood and managed. (p. 31)

Change invokes simultaneous personal feelings of fear and hope, anxiety and relief, pressure and stimulation, threats to self-esteem and challenges to master new situations (Fullan & Stiegelbauer, 1991). Tichy and Devanna (1986) stated, “The task of transformational leaders is to recognize these mixed feelings, act to help people move from negative to positive emotions, and mobilize the energy needed for individual renewal” (p. 32). They indicated, “Strong leaders must learn to be listening leaders as
well. A frequent complaint voiced about leaders is that it is hard to get them to listen patiently" (p. 54). Tichy and Devanna (1986) also pointed out:

Change, whether at the societal, organizational, or individual level, means dislocation or discomfort.... A society facing change must go through a period of disintegration before it can reintegrate. During the disintegration there are dislocations, discomforts, and a price paid for change.... People in organizations going through quantum change must come to grips with some unpleasant realities. As they change their behavior they must struggle to get some closure on the old way of doing things and learn to establish new routines.... Transformational leaders must understand how people deal with change. Overcoming resistance by people used to the old ways is more complex than merely issuing orders that a new era now exists.... People must be given a way to work out the psychodynamics of closing off what has been to endings, working through a transition period, and taking up new beginnings. (p. 60)

In Taiwan they are now experiencing these realities. Tichy and Devanna (1986) concluded that when the individual has made the necessary adjustment to changing circumstances then they are able to release the energy needed to deal with the new situation. People have managed to release themselves from the behaviors, patterns, and attitudes that need to be left behind, and they have started to write new scripts that contain new behaviors and attitudes. The group might be struggling through the individual dynamics of change. Before a vision could be created and before people could be committed to that vision, they needed to work through their own feelings about what has happened to the organization (Tichy & Devanna, 1986).
Organizational Resistance to Change

The nature of organizations and people makes it difficult for them to change in the fundamental ways. The ability to change organizations is hampered in many different ways. Tichy and Devanna (1986) concluded that there are three factors affecting people’s resistance to change. First, technical reasons include: (a) habit and inertia, (b) fear of the unknown or loss of organizational predictability, and (c) sunk cost. Individuals who have always done things one way have trouble changing behavior patterns. Not knowing or having difficulty predicting the future creates anxiety and hence resistance in many individuals. Organizations, even when realizing that there are potential pay-offs from a change, are often unable to enact a change because of the sunk cost of the organization’s resources in the old way of doing things.

Second, political reasons include: (a) threats to powerful coalitions, (b) zero sum decision-making resulting from limitations on resources, and (c) the indictment of leadership problem. A common threat is found in the conflict between the old guard and the new guard. Psychologically it is very difficult for people to change when they were party to creating the problems they are trying to change.

Third, cultural reasons include: (a) cultural filters resulting in selective perception, (b) regression to the good old days, and (c) lack of climate for change. An organization’s culture may highlight certain values, making it difficult for members to conceive of other ways of doing things. An organization’s culture defines that which people perceive as possible. People often feel secure when returning to the past. It was a time when the cultural response put on tremendous pressures for a regression to the good old days. Organizations often vary in their conduciveness to change. Cultures that require a great
deal of conformity often lack much receptivity to change. A transformational leader must
determine which members of the management team can adjust to the changing demands
and which members cannot. It is helpful to provide the opportunity to examine values,
talk about them, and discuss what needs to be changed. (pp. 74-83)

Jacobson and Conway (1990) posited that changing paradigm as following:
The world is currently going through a basic shift in its technoeconomic
paradigm that is affecting the very structure and conditions of production and
distribution for almost all sectors of the economy. This paradigm shift is
manifest in educational institutions in what has been called the educational
reform movement. An educational system designed for an industrial age is
slowly adapting to the requirements of an information society. (p. 113)

This shifting paradigm in the education system will transform the role of
university instructors in Taiwan from purveyors of information to managers of instruction.
Jacobson and Conway (1990) recommended that instructors needed to be visionaries,
planners, coordinators, and negotiators and need to be liaisons with the community and
other levels of the organization.

*Overcoming Resistance to Change*

Almost every corporate initiative impacts the performance negatively at the
beginning (Daniels, 2000). While the reformer may understand that there are long-term
benefits to the organization and to the reformer personally, the immediate consequences
of doing things differently are usually negative. New behaviors require extra efforts to
learn, result in increased mistakes, cause the reformers to fall behind in their other work,
and create stress because people fear that they won’t be able to learn or perform well with
new conditions (Daniels, 2000). Daniels (2000) suggested, "people don’t resist change if the change provides immediate positive consequences for them. To make change a positive experience, leaders need to be less concerned with managing the change, and more attentive to managing the consequences associated with change" (pp. 31-32).

Koehler and Pankowski (1997) concluded that when a leader tries to advance a new order, he will no doubt meet significant resistance. It is natural for people to resist things that they do not understand. When people do not understand something, they become uncertain and begin to wonder how the changes will affect them. The question always before them is how will I benefit from that change? Dealing with change in today’s work environment is a daily occurrence (Koehler & Pankowski, 1997).

Koehler and Pankowski (1997) advocated, “when system-wide changes are proposed, anxiety and uncertainty are likely to emerge. Therefore, it is the leader’s responsibility to reduce anxiety and uncertainty by showing how the proposed change will benefit associates” (p. 151). Koehler and Pankowski (1997) have specified:

The problem with government administrators is that many believe that management should be for their own convenience and not for the convenience of their subordinates.... Top management complained about how front-line workers resisted change.... Even today, many top managers significantly resist empowering associates within their departments. (P. 152)

They stated that government administrators may be enamored of their positions and expected to maintain positional power. They warned that both the administrators and subordinates’ overcoming resistance is perhaps the most significant challenge to changing government.
Therefore, to inspire change, empowering subordinates to be a part of the change process is vital. Koehler and Pankowski (1997) made a conclusion that “Sometimes administrators are so resistant to change that the only way to convince them to change is to have them perceive economic losses or loss of position before they will accept change” (P. 152).

Communication is vital throughout the process of educational reforms and the accompanying changes that occur. There are many avenues that one takes when attempting to communicate a new idea or a new paradigm, and some of the methods and strategies will be illustrated in the following section.

Communication

Communication plays an important role in the organizational process. Senge (1990) viewed team learning as “the process of aligning and developing the capacities of a team to create the results its members truly desire. Team learning builds on personal mastery and shared vision, which allows people to be able to act together” (p. 236). When teams learn together, Senge (1990) suggested that not only can there be good results for the organization, members also will grow more rapidly than could have occurred otherwise.

Seyfarth (1999) asserted that being open and honest regarding organizational communication is a requirement for a quality-managed organization. For an organization to be effective, associates must be trusted and respected. Therefore, it should not be the role of upper management to tell associates only what they need to know, but rather to share information together with all levels (Seyfarth, 1999). In order to improve an organization, associates must not only understand what is occurring in the process to
which they are assigned, but also in all other processes as well. If top management does not trust its associates, and people are punished for delivering bad news regarding quality indicators, then it will be impossible to drive out fear in the organization. If there is fear in the organization, management is likely to get only data that fits their wants and needs (Seyfarth, 1999). Senge (1990) concluded:

The discipline of team learning starts with 'dialogue' the capacity of members of a team to suspend assumptions and enter into a genuine 'thinking together'. To the Greeks *dia-logos* meant a free-flowing of meaning through a group, allowing the group to discover insights not attainable individually.... The discipline of dialogue also involves learning how to recognize the patterns of interaction in teams that undermine learning.

When dialogue is joined with systems thinking, there is the possibility of creating a language more suited for dealing with complexity, and of focusing on deep-seated structural issues and forces rather than being diverted by questions of personality and leadership style. Indeed, such is the emphasis on dialogue in his work that it could almost be put alongside systems thinking as a central feature of his approach. (p. 10)

Koehler and Pankowski (1997) advocated, “communication is a process where a message sender intentionally stimulates a desired message in the mind of a receiver” (p. 88). The administrators always understand the importance of communication skills. They practice their communication skills daily by sending messages upward, downward, and horizontally in the organization. Administrators generally transmitted information upward in the organization relating to job assignment, performance, problems, organizational
practices or policies, and the methodology for accomplishing tasks. They understood that positive upward communication was more likely to be used by those above them than negative communication. They further understood that upward communication should be timely and was more likely to be accepted if supportive of current policy. They understood that upward communication was more likely to be effective if it went directly to a receiver who could act on it (Koehler & Pankowski, 1997). Koehler and Pankowski (1997) described:

Downward communication usually dealt with job instructions, rationale, information, and feedback.... Horizontal communication allows coordination between departments to maximize productivity. It allows problem solving at the level of origin, and thus increases morale and confidence of the individuals involved in the problem solving process. It allows sharing of information and is useful in solving intradepartmental and interdepartmental conflict. Finally, it serves as a substitute for upward and downward communication in some situations.... Administrators understand that they can improve their communication skills by being knowledgeable about human behavior and are sensitive to the feelings and attitudes of others. (p. 89)

Fullan and Stiegelbauer (1991) spoke to the evolutionary nature of change and said that access to innovative ideas “depends on an infrastructure of communication” (p. 53) which many schools lack. They suggested that “Change involves learning to do something new and interaction is the primary basis for social learning” (p. 77). Fullan (1993) identified:
The center and [teachers] need each other. You can’t get anywhere by swinging from one dominance to another. What is required is a different two-way relationship of pressure, support and continuous negotiation. It amounts to simultaneous top-down, bottom-up influence. Individuals and groups who cannot manage this paradox become whipsawed by the cross-cutting forces of change. (p. 38)

Fullan (1993) also proposed, “two-way, top-down/bottom-up solutions are needed in which schools and districts influence each other through a continually negotiated process and agenda” (p. 128). He described the elements of such a process to integrate school and district-level development.

In conclusion, effective communication involves a two-way flow. By stimulating and clarifying communication, the leader ensures that all members have an opportunity to contribute their ideas. These activities also reduce misunderstanding and confusion by providing opportunities for members to explain any ideas or suggestions that may be unclear.

Motivation

McInnis (2000) found that between 1993 and 1999 the level of Australian faculty’s overall satisfaction with the job fell from 67 to 51 per cent. Fifty-six per cent added that their work was a source of considerable stress. People have an intrinsic motivation by getting psychic rewards from their work (Knight, 2002). Knight (2002) stated:

They may want to be satisfied with salary levels, promotion prospects and the ways in which they are managed (hygiene factors) but they are mainly satisfied or fulfilled by the intellectual challenge of research, the joys of teaching and the
emotional quality of the communities of practice in which they work (motivating factors). Psychic rewards are opportunities for fulfillment and self-actualization in the workplace are major sources of faculty motivation. (p.11)

Knight also indicated:

As long as schoolteachers and academic staff can find space for the work that thrills them and as long as they can get some fulfillment from face-to-face teaching, from interaction with colleagues and, in HE, from scholarship, then changes that make the workplace more challenging stand a good chance of being accommodated because staff can still feel some sense of control and reward. (p.12)

Among the behavioral theories embraced by American business are Herzberg, Mausner, and Snyderman (1959) and Maslow (1970). Herzberg proposed a theory about job factors that motivate employees. Maslow developed a theory about the rank and satisfaction of human needs and how people pursue those needs. Herzberg et al (1959) constructed a two-dimensional paradigm of 'hygiene' (dissatisfiers) factors that do not actually motivate or create satisfaction and 'motivators' (satisfiers). Five motivators in particular were strong determiners of job satisfaction including achievement, recognition, the work itself, responsibility, and advancement. Maslow's (1970) hierarchy ranks needs from the psychological, through safety, love and belongingness, esteem, and self-actualization. He theorized that a person could not pursue the next need until the currently recognized need was substantially or completely satisfied. As Knight (2002) stated:
Of course, disillusioned people continue to do academic work and some are mainly motivated by extrinsic rewards, but because professional work requires the non-routine exercise or expert judgement, it thrives on creativity, intuition, dynamism, insight and the other qualities that come from pleasured commitment, not from extrinsic motivation. (p.12)

Managing Systematic Change

To change the order of things is often very difficult as human beings resist being forced into unfamiliar settings. Keefe, Jenkins, and Hersey (1992) emphasized that improvements occur only with changes in values and expectations within the cultural perspective. The political perspective, dominant during the 1980s, resulted in top-down reforms that achieved little. The cultural perspective, nurtured by the school climate and culture movement, propelled the bottom-up restructuring efforts of the 1990s in the United States. Keefe, Jenkins, and Hersey (1992) recognized that systematic change can produce obstacles to change, even change that is well-conceptualized, funded, and implemented.

Jacobson and Conway (1990) demonstrated, “There is a recursive relationship between education and technological innovation. Technological innovations place social and economic pressures on educational institutions to change” (p. 113). In Taiwan, the most dramatic changes that are occurring are affecting instructors’ roles in higher education institutions. High-caliber and highly trained instructors will be largely responsible for curricular and instructional decisions that are being implemented to meet the goals of 1996 reforms.
Change is a complex process and is influenced by many forces. Elmore et al (1990) stated that change is scary. Any venture into the unknown is uncomfortable and involves a degree of risk. Urbanski (1991) of the Rochester Teachers Association wrote about the restructuring experiments in the Rochester City Schools in this way:

Real change is real hard. It is an inductive process, a search. Along the way we have encountered some false starts, wrong turns, and negative findings. We experienced turf wars... community opposition... and resistance from some teachers.... Yet the pain involved may in itself be evidence that the changes we are attempting are substantive. And real change also takes real time. Expecting extraordinary results very quickly is unrealistic. (Keefe, Jenkins, & Hersey, 1992, p. 38)

Various problem themes recur in any program of planned change. Charters and Pellegrin (1973) compiled the following problem list for consideration by schools attempting comprehensive improvements. Those obstacles to change are:

(a) unclear goals---what you hope to accomplish, (b) assumption that behavioral changes will follow structural changes---new structures help but do not cause change, (c) same assumption for values---program philosophy must be internalized by staff, students, and parents. Communication and conversation are necessary, (d) same assumption for objectives---support structures are needed, such as time for inservice training and development of materials, (e) unrealistic time perspective---five to ten years are required for long-term, institutionalized improvements, (f) untrained staff---staff development and deployment are often inadequate, (g) role overload-unclear position descriptions or unrealistic start---up work load to plan and implement the changes, (h) lack of resources---deficiencies
in the school building, media, and reference materials, and in community support, (i) lack of evaluation technology—insufficient total program evaluation, (j) inadequate ideology of self-governance—unsatisfactory administrative organization, common channels, school-based and participatory structures. (Keefe, Jenkins, & Hersey, 1992, p. 39)

Conflict

Managing conflict has become an important part of the leaders’ job as schools create more innovations for posing new issues, and people with divergent views take advantage of the opportunity to speak out.

In the change process, too much standardization or early incorporation can ruin otherwise successful efforts. Walcott (1973) indicated that the change process is the period in which great effort, vast amounts of time, and considerable money are expended in getting started. Walcott (1973) went on to say that adopting the same procedures throughout the entire school or district to offset increased workload or in response to parent or teacher criticisms can result in loss of flexibility and creativity. He also suggested that there is an ever-present temptation to end the implementation effort too soon (after two or three years) in response to emotional exhaustion or loss of key personnel and pointed up the need for long-term planning, perseverance, and staff stability (Walcott, 1973).

Keefe, Jenkins, and Hersey (1992) posited that relationships established for a specific purpose can last over time and build the investment in school and community necessary for successful change. Existing restructuring efforts can also teach about dealing with obstacles to organization change. Lieberman (1991) observed:
(a) Changes causes conflict because involving more people unearths new opinions and new problems, (b) participants in change must learn to trust, which may be difficult for those comfortable with the traditional bureaucracy, (c) teams must include as many persons as possible to avoid an elitist label or even active resistance from those excluded, (d) the process of change is as important as the content. Teams must build trust and commitment along with the skills of school improvement. (Keefe, Jenkins, & Hersey, 1992, p. 40)

As societies adopt technologies into every aspect of their lives, schools must be ready to incorporate and manage technologies as they are infused into the school setting. The following will explain the various facets that managing technology encompasses.

Managing Technology in Schools

Technology is forcing institutions to change. Tichy and Devanna (1986) indicated the need for change is triggered by environmental pressure. Tichy and Devanna (1986) illustrated this concept:

Once organizational leaders accept the fact that their business environment is changing, key decision makers in the organization must be made to feel dissatisfaction with the status quo. The felt need for change provides the impetus for transition, but this process does not always go smoothly. A key to whether resistant forces deter the organization from making the needed adjustments to environmental shifts is the quality of the leadership that is brought to bear. The leaders involved in organizational transformation need to create a vision that a critical mass of employees will accept as a desirable change for the organization. Each leader must develop a vision and communicate it in a way that is congruent with the leader’s philosophy and style. (p. 30)
Schlechty (1997) stated that technology is constantly changing, and each new advance in technology alters in varying ways how work is done. The invention and continual refinement of computers has led to better and faster ways of storing and retrieving information and to the development of new managerial and instructional practices. Although schools have been slow to adopt this improved technology, they are now beginning to use it.

**Stress**

A study in 1991 by Farber and Ascher indicated the school restructuring movement may intensify teachers' frustration. The stresses and tensions associated with school reform were caused by (a) school based management, (b) accountability, (c) curriculum initiatives, (d) career ladders (respect, prestige), and (e) the intense atmosphere and professional demands. Farber and Ascher (1991) also emphasized that school reform has been found to be one of the sources contributing to burnout.

According to Schamer and Jackson (1996), the effects of extreme or unproductive levels of stress can cause teachers to have negative attitudes toward students and to lose their idealism, energy, and purpose. Eskridge and Coker (1985) pointed out that stress results in a broad intensity of physical symptoms for educators. Stress can also make teachers become ineffective and inefficient in their teaching roles. In addition, Phillips (1993) demonstrated that stresses can have a negative influence on schools, overall teaching performances, and the physical and emotional well being of teachers and students. Fimian (1980) stated that educators and teachers must learn to identify the stress factors, to face the problem, and to learn stress reduction techniques. Schamer and Jackson (1996) also concerned that teachers require good coping skills and support if
they are not to succumb to the physiological and psychological problems associated with stress.

Kezar (1999) indicated that there is a gap in the literature on restructuring. He indicated that there is a distinct tension between the faculty and administrators’ viewpoints. Faculty argued that teaching, learning, and students were not adequately considered in educational reforms and that the faculty’s professional identity is being ignored (Kezar, 1999). Phipps (1996) pointed out that governing boards and administrators argued that some fundamental questions must be addressed, such as what and how students should learn, equitable faculty teaching loads, the quality and definition of research, and the role of tenure in promoting the institutional mission. Morris (1974) believed that tension sometimes arises between top-down and bottom-up views of change. When school-level personnel are forced to adopt prescribed changes, tensions are generated. Keefe, et al. (1992) indicated that restructuring efforts are more likely to persist when school staffs decide for themselves what direction they wish to take and progress at a pace that is comfortable for them. Progress in restructuring is affected by a number of forces that may either impel or impede change.

Tyack (1993) demonstrated that schools are resilient institutions that change slowly even under considerable pressure. The unprecedented levels of dissatisfaction among the schools and the public insistence suggest that change is inevitable. Change requires taking risks. Teachers and administrators have an opportunity and responsibility to make their views heard in a careful consideration. Manasse (1995) indicated that change only takes place with leadership.
Leadership in Times of Reform

Conger and Kanungo (1998) pointed out leadership plays an important role in the creation, survival, growth, and decay of an organization. Bennis and Nanus (1985) indicated that concept:

By focusing attention on a vision, the leader operates on the emotional and spiritual resources of the organization, on its values, commitment, and aspirations. It remains for the effective leader to help people in the organization know pride and satisfaction in their work. (p. 92)

Kotter (1988) proposed that leadership is concerned with activities that produce constructive or adaptive change and is focused on the long-term issues of the organization. Kotter believed that leadership acquired commitment to performance through empowerment. Conger and Kanungo (1998) mentioned in the 1980’s, Burn’s (1978) ideas would have great appeal to organizational theorists grappling with the twin issues of organizational change and empowerment.

Transformational leaders have to convince administrators to personally accept the benefits derived from an empowerment system or to remove those who are not willing to accept this system (Conger & Kanungo, 1998). Bass (1990) posited that “The transformational leader communicates high expectations, uses symbols to focus efforts, and expresses important purposes in simple ways” (p. 22). Intellectual stimulation and being able to inspire subordinates is the responsibility of the leader. The leader needs to articulate a flow of new ideas and perspectives that challenge followers to rethink old and conventional ways of approaching organizational tasks. Bass and Avolio (1993) prompted that transformational leadership provides encouragement and support to followers, assists
their development by promoting growth opportunities, and shows trust and respect for
them as individuals. They purported that the role of a transformational leader is to bond
the leader and the led, and to build follower self-confidence and heighten personal
development.

House (1977) theorized that leaders could simultaneously communicate high
performance expectations, as well as confidence in their followers' ability to meet such
expectations. These actions enhanced follower expectations. Leaders demonstrated the
values and beliefs they wished for followers to endorse so that the mission would be
successful (House, 1977).

Seyfarth (1999) proposed, “leadership is exercised in many ways-through
c FormControl conversations, speeches, written reports, letters and memoranda, and through face-to-face
discussion with groups or individuals” (p. 76). Leaders attempt to reconcile individuals' commitment to their personal goals with the organization’s interest in accomplishing
organizational missions. Because of the divergence between individual interests and
organizational purposes, leaders must find ways to motivate followers to pursue
working to increase members’ identification with and commitment to the organization’s
mission and by encouraging members to actively participate in governance” (p. 82).

Educational leaders must take responsibility for managing their institutions.
Although transformational leadership qualities have been difficult for educational leaders
to utilize, change may be better received if transformational aspects are applied.
Summary of the Review of the Literature

Literature that pertains to educational reform was reviewed in this chapter. This review of the literature encompassed the studies and information relevant to Taiwan and other countries concerning educational reforms. The advancement of science and technology has had a great effect on educational reform (Yang, 2001). Trow (1975) indicated that in the Third World higher education has expanded rapidly. In recent years, there has been an increase in the establishment of research institutions, technical colleges and other academic institutions that are designed to meet specific needs and serve certain populations (Altbach, 1991). Currently, the main focus of the expansion is in the Third World and the newly industrialized countries (Altbach, 1991).

Other trends for higher educational reform, such as bureaucratization, accountability, educational quality, access to technology, redefining higher education, life-long learning, continuing education, and certification are also attainable (Kezar, 1999). Western universities were seen as successful in providing advanced education; fostering instructors’ quality, students’ quality, instructional pedagogy, research and scientific development; and assisting their societies in the increasingly complex tasks of development.

After educational reform, universities were changed and decision making was democratized, universities were decentralized, educational access was expanded, interdisciplinary teaching and research was instituted, and the curriculum was expanded to vocational courses (Altbach, 1991). In addition, the higher education reforms are also concerned about administrative efficiency, accountability and shared control over educational enterprises.
The literature has reviewed a number of important factors related to change such as leadership style, human resistance to change, instructors' role and productivity, communication channel, and motivation that affect the success of the educational reform process. These problems and challenges are demanding the very best leadership. The literature concluded that leadership plays an important role in program development, implementation, and evaluation of the whole educational restructuring (Keefe, Jenkins, & Hersey, 1992).

Research on educational reform in Taiwan explores the educational system and is often focused on students' needs. Research has not been focused on the instructors' perspectives of the dramatic system change from Junior Colleges to Institutes or Universities of Technology. This review of the literature elaborated on pertinent themes that frame this study. Understanding of the factors influencing educational reform is a crucial point for Taiwan's higher technological and vocational education (HTVE).
CHAPTER THREE

METHODOLOGY

Taiwan is presently depending on its higher academic institutions to provide the basis for desired technological and therefore economic progress through educational reform. As part of these reforms, the Taiwan government is upgrading their two and five year junior colleges to institutes of technology and then to universities of technology.

The review of literature pointed out that instructors’ quality, students’ quality, pedagogy, and information technology are essential to the success of the educational reform. The purpose of this study was to analyze instructors’ perceptions of their own roles in the new higher technological and vocational education (HTVE) reform in Taiwan and how that perception may relate to both positive and negative attitudes toward reform, and if the goals established by the Ministry of Education’s 1996 educational reforms appear to be progressing.

Research Design

This study was conducted by using the quantitative research paradigm and employed both descriptive and correlational research methodology. The study correlated the instructors’ responses with each of the variables such as age, gender, years of teaching, average class size, number of classes taught, and other demographic and descriptive variables. The descriptive part of the study involved describing and characterizing the sample on various analyses of instructors’ responses. The proposed study utilized a questionnaire based upon the review of the literature in order to analyze the perceptions of technological and vocational instructors on higher education reforms in Taiwan that have been implemented since 1996 and their roles therein.
Population and Sample

The central district of Taiwan served as the site for this research. This central district has a population of approximately 5,700,000, and includes six demographic areas (Executive Yuan, 2003). Within these six demographic areas, there are 14 institutions that have been promoted from junior colleges to institutes of technology, or even further, to universities of technology since 1996. These 14 institutions employ approximately 4,000 instructors and have a population of 120,000 students (The Ministry of Education, 2003).

The population base for this study consisted of full-time faculty in these 14 institutions. All institutions granting permission for this research were surveyed, representing six demographic areas. From each of these granting institutions, 100 full-time instructors were randomly selected to participate in this research project. The sample for this study was nine institutions who granted their instructors permission to participate in this study. One-hundred full-time instructors were randomly selected from each of those six institutions, and the remaining three institutions would accept 50 surveys for full-time instructors. A total of 750 instructors were included in the sample for this study.

Analysis

To survey this sample a questionnaire was used and all demographics were compiled from Questions 1-12. Questions 13-17 were used to score the respondents’ attitudes toward reform; Questions 18-22 were used to score the respondent’s work environment as it related to educational reform; Questions 23-24 provided information regarding leadership; the remaining questions were used for analyzing specific areas of success and concern reflecting workload. A positive attitude (Q 13-17), positive work
environment (Q 18-22), and leadership (Q 23-24) were defined as at least 60% positive responses for those who responded decisively in each area.

For the perception of instructors' experience, Part (A) was used to score the respondents' perception of instructors' quality; Part (B) was used to score the respondents' perception of students' quality; Part (C) was used to score the respondents' perception of pedagogy; and Part (D) was used to score the respondents' perception of information technology. A positive perception was defined by at least 60% positive response rate within each domain.

Instrumentation

A pilot study was conducted prior to the overall survey. The self-administered questionnaire surveyed the targeted sample. The questionnaire was used to determine the instructors' attitudes in general toward educational reform, the environment in which instructor works, and the workload requirements as required by educational reform. The questionnaire also determined the instructors' perceptions of the status of educational reform using the following indicators (instructors' quality, students' quality, pedagogy, and information technology) as identified by a review of the literature.

The degree to which instructors perceive the success of educational reform was compared to their attitudes, environmental conditions, and job expectations as required by educational reform. Factors associated with successful and unsuccessful perceptions of educational reform were analyzed and reported.

From these analyses, the degree of progress of educational reform was determined and the role of the instructors as contributing to that progress was determined. The content of the survey was researched and deemed appropriate for the study by both the
dissertation chair and the researcher. The instrument took approximately 20 minutes to complete. The survey was anonymous with the participants' identities and answers kept strictly confidential.

Variables and Level of Data

The dependent variable used in this study was the responses obtained by each instructor. The independent variables used in this study were the factors of instructors' general attitudes to the educational reform, perceptions of instructors' quality, students' quality, pedagogy, and information technology. The questionnaire consisted of 51 questions with most requiring yes/no/uncertain answers. Descriptive data was categorical, ordinal, and ratio, with the exception of gender, which was nominal and dichotomous.

Null Hypothesis

The null hypothesis for this research was: There was no experimentally important or consistent predictability of Taiwan's technological and vocational instructors' responses toward educational reform using attitudes, perceptions of teaching quality, students' quality, pedagogy, and technological utilization as criterion variables when using demographic variables herein as predictor variables.

A Priori Definitions

Experimental importance. Experimental importance was defined as 70% correct predictability.

Experimental consistency. Experimental consistency was set at the $\alpha = .05$ level.

Statistical Procedure

For this analysis, Discriminate Function Analysis was used to calculate the predictability of the instructors' attitudes toward educational reform. Discriminate
Function Analysis (DFA) is a statistical procedure originally developed "to classify subjects into one of two clearly defined groups" (Mertler & Vannatta, 2002, p. 281). More recently, DFA has been utilized as a kind of *post hoc* procedure for MANOVA analyses. This research employed DFA in its original use whereby interval/ratio level variables were utilized as predictor variables analogous to multiple regression with the distinction that the criterion variable in DFA is nominal and dichotomous rather than interval/ratio as in multiple regression. By using a dichotomous variable, a nominal variable may be considered equal interval as a result of the identity property in which a single interval between the two levels of that variable is equal to itself (Sarle, 1996). The assumption of normality was met by having sufficient sample size. Additional analysis was made to determine any relationship that may exist between attitudes toward reform and other variables identified in the survey. Any relationships, positive or negative, between reform and other variables were reported.

*Data Collection*

The researcher utilized three professors who are experts in Chinese and English and are good at bilingual-language translation to translate the English questionnaire into Chinese for the initial pilot study in order to minimize translation and content errors. When the translation was completed, the researcher asked 10-15 instructors to do a pilot study. The first pilot study was mailed to 13 instructors at four different institutions on March 12, 2004. Based on the participants’ recommendations, a second pilot study was administered at three different institutions on April 9, 2004. After the pilot study, the researcher, in conjunction with the dissertation chair, made revisions according to the pilot study participants’ suggestions. The packet for participants consisted of a cover...
letter explaining the purpose of the study, an envelope written with return address for the completed questionnaires, and the self-administered survey. This self-administered survey included open-ended and close-ended questions.

A non administrative coordinator randomly selected 100 full time instructors from each of the institutions granting permission to participate in this research. Participation was completely voluntary. The researcher utilized the coordinator as the essential contact for dissemination of the packets to randomly selected faculty. The researcher requested participants to complete all the questions in the questionnaire and asked participants to place the completed questionnaire into the envelope provided, and placed it in their campus mail. The envelope was addressed to the campus coordinator who collected the envelopes for the head coordinator. The head coordinator picked up the envelopes from all of the campus coordinators and mailed them to the researcher. None of the respondents was identified or tracked.

The questionnaires were mailed during the second week of April 2004 with instructions that they were returned by April 26. Each coordinator was notified that he/she had to collect the envelopes in a careful manner for the head coordinator.

The survey in this study was anonymous with participants' identities and answers kept confidential. The questionnaire was not coded in order to ensure anonymity and consequently, the responses were completely anonymous. All of the responses were entered into a computer database without any identification of the respondent or the institution. Only the researcher and the dissertation chair had access to the files, none of which was identified by name or code number of the individual providing the responses. All data obtained were stored in a secure environment. After the data were collected, the
responses from the instructors were coded and entered into a database. These data were reported as aggregate data. All entries were checked for errors.

Reliability and Validity

Reliability

This survey did not have any previous use and, therefore, there is no established reliability. It was doubtful that such a survey would exist for previous use given Taiwan’s pre-reform reluctance to have instructors provide feedback regarding a governmentally implemented program.

Validity

The validity for this research was determined in two ways. First, a review of the literature supported the content validity of various items on the survey. Second, content validity and face validity were further evaluated by the pilot study.

The primary threat to internal validity was that of selection, that was, intact groups were used for this research. Threats to external validity were controlled to the degree that the samples taken from the population of the institutions in central Taiwan were randomly selected and generalizable only to central Taiwan.

Limitations

The survey was translated into Chinese with care given to differences in expressions between English and Chinese. It was anticipated that there were some cultural differences between the two languages that would make it difficult to provide for a perfect translation in which the English was exactly expressed in Chinese.
Delimitations

This research was delimited in several ways. All institutions surveyed came from the central district of Taiwan and only those junior colleges that were presently reforming or have been reformed since 1996 were considered. In addition, only full-time instructors working in the institutions granting permission were surveyed.

Summary

This study was designed to investigate the instructors' perceptions on the Taiwan's higher technological and vocational education (HTVE) reform implemented since 1996. This chapter discussed the population studied, the research design, development of the questionnaire, statistical procedures, data collection, and data analysis. All appropriate findings were reported.
CHAPTER FOUR
RESULTS AND ANALYSIS OF DATA

Introduction

In order to evaluate instructors' perceptions toward higher technological and vocational education (HTVE) reform in Taiwan, a questionnaire addressing 'Higher Technological and Vocational Education Reform in Taiwan' was circulated at nine institutions throughout central Taiwan. The study was designed not only to determine instructors' perceptions of the results of HTVE reform, but also to analyze their view of their own roles following these reforms.

Distribution of Survey

The 'Higher Technological and Vocational Education Reform' survey was officially approved by the Institutional Review Board (IRB) of The University of Montana with Code #63-04 on April 6, 2004, and the survey was conducted between April 12 and April 26. Of the 14 institutions in central Taiwan, nine granted permission, and survey was distributed among those nine campuses. The sample for this study included nine institutions who agreed to have their instructors participate in this study. One-hundred full-time instructors were randomly selected from each of six institutions, and the remaining three institutions would accept 50 surveys for full-time instructors. The totals of 750 participants were included in the sample for this study. The data for this study were obtained through a questionnaire designed for higher technological and vocational instructors in the central district of Taiwan. This chapter presents the results of the study and all data were carefully checked before coding.
Survey Results

The total 750 population of those nine institutions previously granting permission was requested to return the surveys by April 26. The total number of returned questionnaires was 497 copies out of the 750 sent for a 66% return rate. The percentage of questionnaires returned from each institution is presented in Table 1.

Return Rate

Table 1

Return Percentage of Survey

<table>
<thead>
<tr>
<th>Number</th>
<th>Number of Questionnaires Distributed</th>
<th>Number of Returned Questionnaires</th>
<th>Returned Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td>54</td>
<td>54%</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td>55</td>
<td>55%</td>
</tr>
<tr>
<td>3*</td>
<td>50</td>
<td>37</td>
<td>74%</td>
</tr>
<tr>
<td>4*</td>
<td>50</td>
<td>30</td>
<td>60%</td>
</tr>
<tr>
<td>5</td>
<td>100</td>
<td>67</td>
<td>67%</td>
</tr>
<tr>
<td>6</td>
<td>100</td>
<td>71</td>
<td>71%</td>
</tr>
<tr>
<td>7</td>
<td>100</td>
<td>85</td>
<td>85%</td>
</tr>
<tr>
<td>8</td>
<td>100</td>
<td>85</td>
<td>85%</td>
</tr>
<tr>
<td>9*</td>
<td>50</td>
<td>13</td>
<td>26%</td>
</tr>
<tr>
<td>Total</td>
<td>750</td>
<td>497</td>
<td>66%</td>
</tr>
</tbody>
</table>

*Note: These institutions would accept a maximum of 50 questionnaires

Demographics

The demographic information for the survey participants is presented in Table 2. These demographics consisted of the following characteristics. The mean age of respondents was 41 years with a range of 26 to 63. The average amount of higher education teaching experience was 11 years, with a range of one to 37 years while the
average years of teaching in their current institution was ten years. Additionally the average class size was 46 students, with a range of 30 to 60 with instructors teaching any subjects from four to six classes, with five being the average number of classes taught this year. Teachers also advised an average of 17 students, with a range of 0 to 44.

Table 2

Demographics of Surveyed Instructors

<table>
<thead>
<tr>
<th>Question</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>26</td>
<td>63</td>
<td>41</td>
</tr>
<tr>
<td>2. Years of teaching in higher education</td>
<td>1</td>
<td>37</td>
<td>11</td>
</tr>
<tr>
<td>3. Years of teaching in present institution</td>
<td>1</td>
<td>37</td>
<td>10</td>
</tr>
<tr>
<td>4. Average class size</td>
<td>30</td>
<td>60</td>
<td>46</td>
</tr>
<tr>
<td>5. Number of classes taught</td>
<td>4</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>6. Average student advised</td>
<td>0</td>
<td>44</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 3 presents the demographic information of the responding instructors. There were 35% (175) female respondents and 65% (320) male respondents. There are 17% (82) respondents with backgrounds in Liberal Arts, 59% (282) in Science and Engineering, 19% (90) with Business degrees, and 5% (22) with differing backgrounds. The highest educational level completed for all respondents is the EdD/PhD with 31% (152/489) respondents, while 64% (315/489) have Master’s degrees and 5% (22/489) have Bachelor’s degrees. The academic rank indicated that 65% (320) respondents are lecturers, 14% (70) are assistant professors, 18% (90) are associate professors, and 2% (12) are full professors. Thirty one percent (154) responding instructors have additional administrative duties, while 69% (340) did not. In addition, 77% (385) of respondents have some knowledge about the HTVE reform, while 16% (81) were very knowledgeable, and 6% (31) reported that they had no knowledge about the HTVE reform.
Table 3

Frequencies and Percentages for the Responding Instructors

<table>
<thead>
<tr>
<th>Question</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>175</td>
<td>35%</td>
</tr>
<tr>
<td>Male</td>
<td>320</td>
<td>65%</td>
</tr>
<tr>
<td>Total</td>
<td>495</td>
<td>100%</td>
</tr>
<tr>
<td>8. College Affiliation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liberal Arts</td>
<td>82</td>
<td>17%</td>
</tr>
<tr>
<td>Science/Engineering</td>
<td>282</td>
<td>59%</td>
</tr>
<tr>
<td>Business</td>
<td>90</td>
<td>19%</td>
</tr>
<tr>
<td>Other</td>
<td>22</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>476</td>
<td>100%</td>
</tr>
<tr>
<td>9. Educational Background (Highest level completed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor</td>
<td>22</td>
<td>5%</td>
</tr>
<tr>
<td>Master</td>
<td>315</td>
<td>64%</td>
</tr>
<tr>
<td>EdD/PhD</td>
<td>152</td>
<td>31%</td>
</tr>
<tr>
<td>Total</td>
<td>489</td>
<td>100%</td>
</tr>
<tr>
<td>10. Academic Rank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecturer</td>
<td>320</td>
<td>65%</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>70</td>
<td>14%</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>90</td>
<td>18%</td>
</tr>
<tr>
<td>Professor</td>
<td>12</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td>492</td>
<td>100%</td>
</tr>
<tr>
<td>11. Additional Administrative Duties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>154</td>
<td>31%</td>
</tr>
<tr>
<td>No</td>
<td>340</td>
<td>69%</td>
</tr>
<tr>
<td>Total</td>
<td>494</td>
<td>100%</td>
</tr>
<tr>
<td>12. Knowledge ability about HE Reform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very</td>
<td>81</td>
<td>16%</td>
</tr>
<tr>
<td>Somewhat</td>
<td>385</td>
<td>77%</td>
</tr>
<tr>
<td>None</td>
<td>31</td>
<td>6%</td>
</tr>
<tr>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
</tbody>
</table>

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Findings

The following sections present detailed information of the findings based on questions 13-51 and divided into eight domains: instructors' attitudes, instructors' work environment, leadership, instructors' workload, instructors' quality, students' quality, pedagogy, and information technology in relation to the research question.

Instructors' Attitudes

Questions 13 to 17 concern instructors' attitudes toward higher technological and vocational education (HTVE) reform and their opinions on which the reforms were based. There responses are shown in Table 4.

Table 4
Frequencies and Percentages of Instructor's Attitudes toward Educational Reform

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. The HTVE reform was based upon solid educational principles.</td>
<td>Yes</td>
<td>226</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>114</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>157</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>14. The HTVE reform was based upon good research.</td>
<td>Yes</td>
<td>173</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>178</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>146</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>15. The HTVE reform has achieved a positive influence for the common good of Taiwan.</td>
<td>Yes</td>
<td>149</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>193</td>
<td>39%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>154</td>
<td>31%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>496</td>
<td>100%</td>
</tr>
<tr>
<td>16. Additional financial compensation would motivate instructors to make greater contributions.</td>
<td>Yes</td>
<td>280</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>86</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>130</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>496</td>
<td>100%</td>
</tr>
<tr>
<td>17. I have considered an early retirement since the HTVE reform.</td>
<td>Yes</td>
<td>161</td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>335</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>496</td>
<td>100%</td>
</tr>
</tbody>
</table>

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Instructors' Work Environment

Questions 18 to 22 categorize instructors’ responses to questions concerning their work environment as they related to educational reform. The results are presented in Table 5.

Table 5

Frequencies and Percentages of Instructor's Work Environment

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>18. My institution’s mission and vision are realistic, clear, and attainable.</td>
<td>Yes</td>
<td>343</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>149</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>492</td>
<td>100%</td>
</tr>
<tr>
<td>19. Performance appraisals in my institution are based on clear and objective standards.</td>
<td>Yes</td>
<td>291</td>
<td>59%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>203</td>
<td>41%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>494</td>
<td>100%</td>
</tr>
<tr>
<td>20. My department head has generally been supportive of the faculty.</td>
<td>Yes</td>
<td>407</td>
<td>82%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>87</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>494</td>
<td>100%</td>
</tr>
<tr>
<td>21. I communicate well with the department head about my work needs.</td>
<td>Yes</td>
<td>401</td>
<td>81%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>95</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>496</td>
<td>100%</td>
</tr>
<tr>
<td>22. My work environment promotes cooperation and respect among colleagues.</td>
<td>Yes</td>
<td>434</td>
<td>87%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>62</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>496</td>
<td>100%</td>
</tr>
</tbody>
</table>
Leadership

Questions 23 to 24 were respondents' views on their academic leadership, as shown by Table 6. Eighty-eight percent agreed that the department head utilized instructors' suggestions in solving problems. In addition, ninety-four percent of participants agreed that they would like to be involved in the Ministry of Education policy making.

Table 6

Frequencies and Percentages of Leadership

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>23. My department head utilizes employee</td>
<td>Yes</td>
<td>436</td>
<td>88%</td>
</tr>
<tr>
<td>suggestions in solving problems.</td>
<td>No</td>
<td>59</td>
<td>12%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>495</td>
<td>100%</td>
</tr>
<tr>
<td>24. Faculty should be invited to participate</td>
<td>Yes</td>
<td>465</td>
<td>94%</td>
</tr>
<tr>
<td>in the Ministry of Education's policy-making</td>
<td>No</td>
<td>32</td>
<td>6%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>497</td>
<td>100%</td>
</tr>
</tbody>
</table>

Instructors' Workload

Table 7 provides information regarding instructors' workloads based on the answer to question 25. Seventy-four percent agreed the reforms had increased workload.

Table 7

Frequency and Percentage of Instructors' Workload Increased

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>25. My workload increased since the</td>
<td>Yes</td>
<td>357</td>
<td>74%</td>
</tr>
<tr>
<td>implementation of the HTVE reform.</td>
<td>No</td>
<td>128</td>
<td>26%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>485</td>
<td>100%</td>
</tr>
</tbody>
</table>

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Table 8 provides information regarding instructors' workload based on answers to question 26.

### Table 8

**Frequencies and Percentages and Mean of Additional Hours per Week of Instructors' Workload**

**Question 26:** Please indicate with an N any areas you believe are Necessary for successful educational reform, and indicate with a U any areas you believe are Unnecessary to educational reform. Also, please list after each area the approximate average number of additional hours per week, if any, that are now required of you as a result of educational reform.

<table>
<thead>
<tr>
<th>N or U</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Mean of additional hours/week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>439</td>
<td>93%</td>
<td>8 hrs</td>
</tr>
<tr>
<td>N</td>
<td>439</td>
<td>93%</td>
<td>8 hrs</td>
</tr>
<tr>
<td>U</td>
<td>35</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>474</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Additional education</td>
<td>430</td>
<td>91%</td>
<td>8 hrs</td>
</tr>
<tr>
<td>N</td>
<td>430</td>
<td>91%</td>
<td>8 hrs</td>
</tr>
<tr>
<td>U</td>
<td>41</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>471</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Teaching</td>
<td>399</td>
<td>85%</td>
<td>4 hrs</td>
</tr>
<tr>
<td>N</td>
<td>399</td>
<td>85%</td>
<td>4 hrs</td>
</tr>
<tr>
<td>U</td>
<td>72</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>471</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Advising students</td>
<td>357</td>
<td>77%</td>
<td>3 hrs</td>
</tr>
<tr>
<td>N</td>
<td>357</td>
<td>77%</td>
<td>3 hrs</td>
</tr>
<tr>
<td>U</td>
<td>106</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>463</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td>329</td>
<td>73%</td>
<td>4 hrs</td>
</tr>
<tr>
<td>N</td>
<td>329</td>
<td>73%</td>
<td>4 hrs</td>
</tr>
<tr>
<td>U</td>
<td>120</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>449</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
Question 27, also concerns workload and identifies and ranks where instructors thought the greatest workload increases have been. Instructors were asked to identify whether they believed the requirements added to their workload by educational reform were necessary or unnecessary, to estimate how much additional time per week they are adding to their work as a result, and to suggest an adequate level of additional compensation, if appropriate.

The rank of increased workload and an approximate compensation are presented in Table 9 as a result of answers to question 27 on the questionnaire. The results of Table 8 and Table 9, when viewed together, showed that 45% (162/362) respondents reported research was their largest increase in workload, requiring an additional eight hours per week and thought that compensation should be increased by an average of $107 per week for the additional workload due to research.

There were 33% (115/346) of the respondents who reported additional education was their second largest workload, requiring eight hours per week and thought that compensation should be increased by an average of $86 per week for the additional workload due to additional education.

Teaching was the third largest workload responded by 39% (128/326) instructors, requiring four hours per week with average of $76 per week for the additional workload due to teaching. Counseling/advising students was the fourth place workload responded by 46% (142/312) instructors, requiring three hours per week with an average of $50 per week for the additional workload due to advising, and there were 40% (121/301) of the respondents reported that service was their fifth place workload, requiring four hours per week with compensation by an average of $70 per week for the additional workload due
to service. Table 9 provides frequency and percentage of the necessity for successful reform and increased salary participants indicated would compensate them for the increased workload per week.

Table 9

Frequencies and Percentages of the Necessity and Compensation per Week of Instructors' Workload

<table>
<thead>
<tr>
<th>Rank</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Compensation $/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Research</td>
<td>162</td>
<td>108</td>
<td>44</td>
</tr>
<tr>
<td>Additional education</td>
<td>93</td>
<td>115</td>
<td>64</td>
</tr>
<tr>
<td>Teaching</td>
<td>63</td>
<td>86</td>
<td>128</td>
</tr>
<tr>
<td>Advising students</td>
<td>18</td>
<td>38</td>
<td>66</td>
</tr>
<tr>
<td>Service</td>
<td>49</td>
<td>27</td>
<td>50</td>
</tr>
</tbody>
</table>

Total                                                                                           389

Note: Question 27: If circled ‘yes’ to question 25, please indicate all areas in which the workload has increased by ranking beginning with the numeral 1 to denote the area that has had the greatest impact upon increasing the workload and then continuing through all items you wish to identify and rank as contributing to an increased workload. Also, please indicate an approximate amount that would be satisfactory compensation for any of the increasing workload area.

The rank in Table 9 was determined by considering the mode of each workload. The workloads having the highest frequency for each of five levels was signed the appropriate rank.
Instructors' Quality

Instructors were asked their perceptions based on their experiences. Questions 31-35, described in Table 10, summarized the questions that addressed instructors' perceptions of how HTVE reforms have improved instructors' teaching quality. Sixty-two percent of respondents thought that instructor quality has improved since the reforms and 66% percent thought the reforms have prompted instructors to do research in their field. However, only 50% of participants thought that research would improve teaching quality.

Table 10

Frequencies and Percentages of Instructors' Quality

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. Overall, instructors' quality has</td>
<td>Yes</td>
<td>306</td>
<td>62%</td>
</tr>
<tr>
<td>improved since the initiation of the HTVE</td>
<td>No</td>
<td>88</td>
<td>18%</td>
</tr>
<tr>
<td>reform.</td>
<td>Uncertain</td>
<td>103</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>32. The HTVE reform has encouraged</td>
<td>Yes</td>
<td>247</td>
<td>50%</td>
</tr>
<tr>
<td>more qualified people to enter the education</td>
<td>No</td>
<td>100</td>
<td>20%</td>
</tr>
<tr>
<td>profession.</td>
<td>Uncertain</td>
<td>150</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>33. The HTVE reform has motivated</td>
<td>Yes</td>
<td>327</td>
<td>66%</td>
</tr>
<tr>
<td>instructors to do research in their fields.</td>
<td>No</td>
<td>84</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>86</td>
<td>17%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>34. Research would certainly contribute</td>
<td>Yes</td>
<td>248</td>
<td>50%</td>
</tr>
<tr>
<td>to an improvement of teaching quality.</td>
<td>No</td>
<td>122</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>126</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>496</td>
<td>100%</td>
</tr>
<tr>
<td>35. Returning to additional education will</td>
<td>Yes</td>
<td>212</td>
<td>43%</td>
</tr>
<tr>
<td>improve instructors' teaching abilities.</td>
<td>No</td>
<td>105</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>179</td>
<td>36%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>496</td>
<td>100%</td>
</tr>
</tbody>
</table>
Students’ Quality

Instructors were asked to provide their perceptions based on their experiences.

Questions 36-40, described in Table 11, summarized the questions, which addressed instructors’ perceptions of how HTVE reforms have improved students’ quality.

Table 11

<table>
<thead>
<tr>
<th>Frequencies and Percentages of Students’ Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
</tr>
<tr>
<td>36. The HTVE reform has improved the academic performance of students in general.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>37. The HTVE reform has sufficiently prepared students to meet the needs of changing society.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>38. Students are now more motivated in their chosen fields than prior to the educational reform.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>39. Students’ preparation for class has been improved.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>40. Students are well prepared for the technological changes during the next five years.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

It is interesting to note that 61% of the respondents thought that the reforms had not improved student academic performance and 52% thought these reforms were not preparing students for the changing needs of society. Participants were not convinced that students’ preparation for class had been improved since the reforms were initiated as 67% answer in the negative to that question.
Pedagogy

Instructors were asked to provide their perceptions based on their experiences.

Questions 41-45, described in Table 12, summarized the questions, which addressed perceptions of how HTVE reforms have improved instructors’ pedagogy.

Table 12

Frequencies and Percentages of Pedagogy

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>41. The HTVE reform has improved instructors’ pedagogies.</td>
<td>Yes</td>
<td>192</td>
<td>39%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>136</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>168</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>496</td>
<td>100%</td>
</tr>
<tr>
<td>42. Instructional improvement, if any, has contributed to students’ learning.</td>
<td>Yes</td>
<td>285</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>70</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>141</td>
<td>28%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>496</td>
<td>100%</td>
</tr>
<tr>
<td>43. Most teachers have been sufficiently prepared by professionals in classroom teaching.</td>
<td>Yes</td>
<td>124</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>170</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>203</td>
<td>41%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>44. The HTVE reform has promoted instructors’ utilization of new skills.</td>
<td>Yes</td>
<td>337</td>
<td>68%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>47</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>113</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>45. Technological pedagogy will result in better academic performance for faculty.</td>
<td>Yes</td>
<td>412</td>
<td>83%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>34</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>51</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
</tbody>
</table>
Information Technology

Instructors were asked to provide their perceptions based on their experiences.

Questions 46-51, described in Table 13, summarized the questions, which addressed perceptions of how HTVE reforms have improved instructors’ information technology.

Table 13

Frequencies and Percentages of Information Technology

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>46. Instructors have increased their own technological skills as the result of educational reform.</td>
<td>Yes</td>
<td>274</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>84</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>139</td>
<td>28%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>47. Instructors have improved their computer skills.</td>
<td>Yes</td>
<td>225</td>
<td>45%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>93</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>179</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>48. Instructors are well prepared for technological changes during the next five years.</td>
<td>Yes</td>
<td>132</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>126</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>239</td>
<td>48%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>49. Instructors’ technological knowledge can improve a school’s competitive position.</td>
<td>Yes</td>
<td>324</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>58</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>115</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
<tr>
<td>50. Instructors believe students are being well prepared for the future.</td>
<td>Yes</td>
<td>146</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>344</td>
<td>70%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>490</td>
<td>100%</td>
</tr>
<tr>
<td>51. Information technology will result in better academic achievement for students.</td>
<td>Yes</td>
<td>373</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>44</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>80</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>497</td>
<td>100%</td>
</tr>
</tbody>
</table>
The following Tables from (Tables 14 to 22) enumerate the findings of the survey responses concerning the status of HTVE reform. The overall percentage is the actual percent of respondents who answered yes to a given question.

Part of the analysis utilized an overall percentage and also the phrase ‘decisive percentage’. The overall percentage encompassed all of the data, while the decisive percentage addressed the fact that most questions offered three possible responses, a choice between whether they agreed with the proposition, disagreed with the proposition, or were uncertain of their responses. The decisive percentage was derived from the number of respondents who were willing and/or able to make a decision, and, therefore, answered either yes or no to the questions posed to them. Those who responded ‘uncertain’ were not counted towards the decisive percentage, as their response did not allow for inferences regarding HTVE success, or lack thereof. The uncertain responses are of importance, however, in gaining a perspective of the magnitude of those who were not willing to declare their beliefs and/or those who did not have sufficient information to offer a judgment. For example, Question 13 had responses of: yes = 226, no = 114, uncertain = 157; the total responding either yes or no is 226 + 114 = 340. Therefore, the decisive positive percentage is 226 \div 340, or 66%.

Table 14 displays the overall figures, which shows the percentages regarding all responses to questions 13-51, and includes total responses, and the responses of positive, negative, and uncertain answers respectively.
Table 14

*The Percentages of Responses as Determined by Questions 13-51*

<table>
<thead>
<tr>
<th></th>
<th>Total responses</th>
<th>Positive</th>
<th>Negative</th>
<th>Uncertain</th>
</tr>
</thead>
<tbody>
<tr>
<td>All respondents</td>
<td>19187</td>
<td>10611</td>
<td>5215</td>
<td>3361</td>
</tr>
<tr>
<td>Percentages</td>
<td></td>
<td>55%</td>
<td>27%</td>
<td>18%</td>
</tr>
<tr>
<td>Decision makers</td>
<td>15826</td>
<td>10611</td>
<td>5215</td>
<td></td>
</tr>
<tr>
<td>Percentages</td>
<td></td>
<td>67%</td>
<td>33%</td>
<td></td>
</tr>
</tbody>
</table>

Table 15 presents the overall percentages of positive responses regarding instructors’ attitudes toward educational reform. The percent of decisive responses and the difference of the responses between positive and negative from questions 13-17 are shown.

Table 15

*The Percentages of Positive Responses of Instructors' Attitudes toward Educational Reform as Determined by Questions 13-17*

<table>
<thead>
<tr>
<th></th>
<th>Q13 Solid principles</th>
<th>Q14 Good research</th>
<th>Q15 Common good</th>
<th>Q16 Financial compensation</th>
<th>Q17 Early retirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall percent positive</td>
<td>45%</td>
<td>35%</td>
<td>30%</td>
<td>57%</td>
<td>33%</td>
</tr>
<tr>
<td>Percent decisive</td>
<td>68%</td>
<td>71%</td>
<td>69%</td>
<td>74%</td>
<td>100%</td>
</tr>
<tr>
<td>Percent positive</td>
<td>66%</td>
<td>49%</td>
<td>44%</td>
<td>23%</td>
<td>67%</td>
</tr>
<tr>
<td>Percent negative</td>
<td>34%</td>
<td>51%</td>
<td>56%</td>
<td>77%</td>
<td>33%</td>
</tr>
<tr>
<td>Difference</td>
<td>33%</td>
<td>-2%</td>
<td>-13%</td>
<td>-53%</td>
<td>35%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 16 illustrates the overall percentages of positive responses regarding instructors' work environment toward educational reform. Table 16 also presents percent of decisive responses, and the difference of the responses between positive and negative from questions 18-22.
Table 16
The Percentages of Positive Responses of Instructors' Work Environment toward Educational Reform as Determined by Questions 18-22

<table>
<thead>
<tr>
<th>Q18</th>
<th>Q19</th>
<th>Q20</th>
<th>Q21</th>
<th>Q22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision clear</td>
<td>Appraisals objective</td>
<td>Head supportive</td>
<td>Communicate well</td>
<td>Cooperation and respect</td>
</tr>
<tr>
<td>Overall percent positive</td>
<td>70%</td>
<td>59%</td>
<td>82%</td>
<td>81%</td>
</tr>
<tr>
<td>Percent decisive</td>
<td>99%</td>
<td>99%</td>
<td>99%</td>
<td>100%</td>
</tr>
<tr>
<td>Percent positive</td>
<td>70%</td>
<td>59%</td>
<td>82%</td>
<td>81%</td>
</tr>
<tr>
<td>Percent negative</td>
<td>30%</td>
<td>41%</td>
<td>18%</td>
<td>19%</td>
</tr>
<tr>
<td>Difference</td>
<td>39%</td>
<td>18%</td>
<td>65%</td>
<td>62%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 17 presents the overall percentages of positive responses regarding leadership toward educational reform.

Table 17
The Percentages of Positive Responses of Leadership toward Educational Reform as Determined by Questions 23-24

<table>
<thead>
<tr>
<th>Q23</th>
<th>Q24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head utilizes suggestions</td>
<td>Faculty participate in policy-making</td>
</tr>
<tr>
<td>Overall percent positive</td>
<td>88%</td>
</tr>
<tr>
<td>Percent decisive</td>
<td>100%</td>
</tr>
<tr>
<td>Percent positive</td>
<td>88%</td>
</tr>
<tr>
<td>Percent negative</td>
<td>12%</td>
</tr>
<tr>
<td>Difference</td>
<td>76%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
</tr>
</tbody>
</table>

The percent of decisive responses and the difference of the responses between positive and negative from questions 23-24 are shown.
Table 18 presents the overall percentages of responses of instructors' workload increased after educational reform from questions 25.

Table 18

<table>
<thead>
<tr>
<th>Q25</th>
<th>Difference</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workload increased</td>
<td>48%</td>
<td>74%</td>
</tr>
</tbody>
</table>

The 74% of the instructors disagreed that there had been an increased workload with the reforms.

Table 19 presents the overall percentages of responses of the necessity of instructors' workloads increased regarding research, additional education, teaching, advising students, and service. Table 19 also enumerates the additional hours per week and the additional compensation toward educational reform that instructors indicated from questions 26-27.

Table 19

<table>
<thead>
<tr>
<th>Workload</th>
<th>Necessary</th>
<th>Unnecessary</th>
<th>Additional Hours/Week</th>
<th>Additional Compensation $/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>93%</td>
<td>7%</td>
<td>8</td>
<td>107</td>
</tr>
<tr>
<td>Add Ed</td>
<td>91%</td>
<td>9%</td>
<td>8</td>
<td>86</td>
</tr>
<tr>
<td>Teaching</td>
<td>85%</td>
<td>15%</td>
<td>4</td>
<td>76</td>
</tr>
<tr>
<td>Advising</td>
<td>77%</td>
<td>23%</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>Services</td>
<td>73%</td>
<td>27%</td>
<td>4</td>
<td>70</td>
</tr>
<tr>
<td>Average</td>
<td>84%</td>
<td>16%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>27</td>
<td>389</td>
</tr>
</tbody>
</table>
Table 20 presents the overall percentages of positive responses regarding instructors' quality toward educational reform. The percent of decisive responses and the difference of the responses between positive and negative from questions 31-35 are shown.

Table 20

<table>
<thead>
<tr>
<th>Question</th>
<th>Quality improved</th>
<th>Encouraged qualified</th>
<th>Motivated research</th>
<th>Research contributed</th>
<th>Additional education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q31</td>
<td>61%</td>
<td>50%</td>
<td>66%</td>
<td>50%</td>
<td>43%</td>
</tr>
<tr>
<td>Q32</td>
<td>79%</td>
<td>70%</td>
<td>83%</td>
<td>74%</td>
<td>64%</td>
</tr>
<tr>
<td>Q33</td>
<td>78%</td>
<td>71%</td>
<td>80%</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>Q34</td>
<td>22%</td>
<td>29%</td>
<td>20%</td>
<td>33%</td>
<td>33%</td>
</tr>
<tr>
<td>Q35</td>
<td>55%</td>
<td>42%</td>
<td>59%</td>
<td>34%</td>
<td>34%</td>
</tr>
</tbody>
</table>

Table 21 shows the overall percentages of positive responses regarding students' quality toward educational reform. The percent of decisive responses and the difference of the responses between positive and negative from questions 36-40 are shown.

Table 21

<table>
<thead>
<tr>
<th>Question</th>
<th>Quality improved</th>
<th>Prepared society</th>
<th>More motivation</th>
<th>Preparation for class</th>
<th>Preparation tech changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q36</td>
<td>14%</td>
<td>14%</td>
<td>23%</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td>Q37</td>
<td>75%</td>
<td>66%</td>
<td>71%</td>
<td>79%</td>
<td>69%</td>
</tr>
<tr>
<td>Q38</td>
<td>18%</td>
<td>21%</td>
<td>33%</td>
<td>15%</td>
<td>17%</td>
</tr>
<tr>
<td>Q39</td>
<td>82%</td>
<td>79%</td>
<td>67%</td>
<td>85%</td>
<td>83%</td>
</tr>
<tr>
<td>Q40</td>
<td>-63%</td>
<td>-59%</td>
<td>-34%</td>
<td>-70%</td>
<td>-65%</td>
</tr>
</tbody>
</table>

Average -58%
Table 22 shows the overall percentages of positive responses regarding pedagogy toward educational reform. The percent of decisive responses and the difference of the responses between positive and negative from questions 41-45 are shown.

Table 22

*The Percentages of Positive Responses of Pedagogy toward Educational Reform as Determined by Questions 41-45*

<table>
<thead>
<tr>
<th></th>
<th>Q41</th>
<th>Q42</th>
<th>Q43</th>
<th>Q44</th>
<th>Q45</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pedagogy</td>
<td>Improvement</td>
<td>Professional</td>
<td>Utilization</td>
<td>Better</td>
</tr>
<tr>
<td></td>
<td>improved</td>
<td>contributed</td>
<td>preparation</td>
<td>tech</td>
<td>performance</td>
</tr>
<tr>
<td>Overall percent positive</td>
<td>39%</td>
<td>58%</td>
<td>25%</td>
<td>68%</td>
<td>83%</td>
</tr>
<tr>
<td>Percent decisive</td>
<td>66%</td>
<td>72%</td>
<td>59%</td>
<td>77%</td>
<td>90%</td>
</tr>
<tr>
<td>Percent positive</td>
<td>58%</td>
<td>80%</td>
<td>42%</td>
<td>88%</td>
<td>92%</td>
</tr>
<tr>
<td>Percent negative</td>
<td>42%</td>
<td>20%</td>
<td>58%</td>
<td>12%</td>
<td>8%</td>
</tr>
<tr>
<td>Difference</td>
<td>17%</td>
<td>61%</td>
<td>-16%</td>
<td>75%</td>
<td>85%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>44%</td>
</tr>
</tbody>
</table>

Table 23 represents the overall percentages of positive responses regarding information technology toward educational reform. The percent of decisive responses and the difference of the responses between positive and negative from questions 46-51 are shown in Table 23.

Table 23

*The Percentages of Positive Responses of Information Technology toward Educational Reform as Determined by Questions 46-51*

<table>
<thead>
<tr>
<th></th>
<th>Q46</th>
<th>Q47</th>
<th>Q48</th>
<th>Q49</th>
<th>Q50</th>
<th>Q51</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Technology</td>
<td>Computer</td>
<td>Instructors</td>
<td>Improve</td>
<td>Students</td>
<td>Students</td>
</tr>
<tr>
<td></td>
<td>improved</td>
<td>contributes</td>
<td>well-prepared</td>
<td>competition</td>
<td>well-prepared</td>
<td>achievement</td>
</tr>
<tr>
<td>Overall percent positive</td>
<td>55%</td>
<td>45%</td>
<td>27%</td>
<td>65%</td>
<td>30%</td>
<td>75%</td>
</tr>
<tr>
<td>Percent decisive</td>
<td>72%</td>
<td>64%</td>
<td>52%</td>
<td>77%</td>
<td>100%</td>
<td>84%</td>
</tr>
<tr>
<td>Percent positive</td>
<td>77%</td>
<td>71%</td>
<td>51%</td>
<td>85%</td>
<td>30%</td>
<td>89%</td>
</tr>
<tr>
<td>Percent negative</td>
<td>23%</td>
<td>29%</td>
<td>49%</td>
<td>15%</td>
<td>70%</td>
<td>11%</td>
</tr>
<tr>
<td>Difference</td>
<td>53%</td>
<td>42%</td>
<td>2%</td>
<td>70%</td>
<td>-40%</td>
<td>79%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>34%</td>
</tr>
</tbody>
</table>
Table 24 presents the overall difference percentages of positive responses regarding instructors' attitudes, instructors' quality, students' quality, pedagogy, and information technology toward educational reform.

Table 24

The Differences of Overall Averages of Instructors' Perceptions toward Instructors' Attitudes, Instructors' Quality, Students' Quality, Pedagogy, and Information Technology

<table>
<thead>
<tr>
<th>Instructors' Attitudes</th>
<th>Instructors' Quality</th>
<th>Students' Quality</th>
<th>Pedagogy</th>
<th>Information Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>0%</td>
<td>45%</td>
<td>-58%</td>
<td>44%</td>
</tr>
</tbody>
</table>

In addition, there are three remaining questions 28, 29, 30, concerning instructors' requirement of workload, obstacles to achieving HTVE goals, and the suggestions for improving the quality of Taiwan's higher education. The purpose for these three questions is to provide instructors an opportunity to express their opinions related to HTVE reform.

Question 28, instructors were asked to list any areas of workload that they believe they may not be able to fully meet, as required by educational reform. Ninety-eight of the 497 instructors responded to this item. These results are summarized in Table 25.

Table 25

Workload that Instructors Thought that They May Not Be Able to Meet

<table>
<thead>
<tr>
<th>Research</th>
<th>Additional Education</th>
<th>Teaching</th>
<th>Counseling/advising Students</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>45</td>
<td>17</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>Percentage</td>
<td>46%</td>
<td>17%</td>
<td>14%</td>
<td>12%</td>
</tr>
</tbody>
</table>

Note: Total respondent number: 98

There were a variety of opinions expressed regarding question 29, where respondents were asked to describe what they believe to be the major obstacles in
achieving new HTVE goals. There were 333 of the 497 instructors who responded to this item. These responses ranged over several categories, and were collected under representative headings and are presented in Table 26.

Table 26

<table>
<thead>
<tr>
<th>Major Obstacles to Achieving Educational Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students' Quality</td>
</tr>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>Percentage</td>
</tr>
</tbody>
</table>

Note: Total respondent number: 333

The majority of comments concerned student quality, and consisted of several components, such as: (a) students lack learning motivation and lack self-study tradition/knowledge to pursue advanced study, (b) students de-value their own school, (c) students have difficulty choosing fields of study, (d) schools don’t offer students’ practical training and don’t provide students’ employability, (e) there are no programs to improve students’ learning habits, (f) teachers have less motivation to offer remedial assistance for students, (g) there are lack of communication channels between students and teachers, and (h) student numbers are decreasing.

There were nearly the same number of comments regarding instructors’ quality and financial shortages. Some concerns regarding instructors’ qualifications included: (a) instructors do not have sufficient professional skills, knowledge and practical training experience, (b) teachers themselves lack correct teaching attitudes, (c) teachers are resistant to change and innovation, (d) teachers have difficulty achieving promotions, and
difficulty publishing in the most prestigious journals, (e) there is a large gap of communication between leaders and teachers, (f) there is a shortage of channels for teachers’ additional education, (g) teachers lack research competency, and (h) promotion pressures result in teachers’ lack of teaching enthusiasm. In addition, instructors expressed concerns about financial shortages which included: (a) lack of funds to cover teachers’ counseling costs, (b) no funding for research environment, equipment, and facilities, and (c) not having sufficient funding for teachers’ additional education.

Instructors expressed frustration with several areas of policy. Policy making areas of concern included: (a) policy is always changeable and vague, (b) the ratio between students and teachers varies among schools, (c) teachers’ workload is not defined clearly, (d) the goals for comprehensive university and vocational education are unclear, (e) the requirement for research university and technological institution is imbalanced, (f) unlimited growth results in unqualified schools, (g) most of new schools have organizational and academic problems, (h) curricula standard is too complicated, and (i) the establishment of new departments and curriculum design cannot meet social needs.

Resource problems specified by the respondents included: (a) institutions lack interaction and cooperation with each other, (b) there is imbalanced financial compensation for private schools from the Ministry of Education, (c) there is a lack of qualified practical teachers, and (d) a lack of practical curriculum knowledge.

Other topics mentioned included: (a) lack of parents’ understanding and contributions, (b) school land area is insufficient, (c) there is a shortage of technological information, (d) there is lack of technical human resources, (e) schools lack the capacity to compete, (f) conflict exists between textbook teaching and practical training, (g)
schools lack their own characteristics and specialties, (h) leaders lack professional leadership ability, and (i) the learning organization lacks a sense of morality and culture.

Finally for question 30, instructors were asked to list three things that could best improve the quality of Taiwan’s higher education. There were 394 of the 497 instructors who took the opportunity to address the importance of HTVE reform and make positive suggestions. These responses varied over a large range. The representative suggestions are presented in Table 27.

Table 27

The Frequencies and Percentages of Suggestions for Improving the Quality of Taiwan’s Higher Education

<table>
<thead>
<tr>
<th>Percentage (Frequency)</th>
<th>Certificate</th>
<th>Cooperation</th>
<th>Financial</th>
<th>Policy</th>
<th>Human</th>
<th>Research</th>
<th>Others</th>
<th>Mechanism with Practical Compensation</th>
<th>Making</th>
<th>Personality</th>
<th>Environment</th>
<th>Fields</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>23% (90)</td>
<td>23% (89)</td>
<td>16% (63)</td>
<td>13% (50)</td>
<td>12% (49)</td>
<td>7% (28)</td>
<td>6% (25)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total respondent number: 394

The majority of concerns were in two areas, certification mechanisms and lack of cooperation with professional fields. Remarks about certificate mechanism included: (a) there should be instituted specific license requirements for all professional fields, (b) strengthen teaching quality to enhance students' ability and learning motivation, and (c) encourage teachers to perform research.

Suggestions regarding cooperation with practical fields included: (a) teachers' knowledge should include practical training, (b) teachers themselves should possess professional licenses and encourage students to do so as well, and (c) it is necessary to establish a system of cooperation between schools and industrial/professional field.

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Financial compensation issues suggestions included: (a) the necessity for a balanced subsidy between public and private schools, (b) schools should have the ability to provide all necessary facilities and equipment, (c) the government should provide good benefits for retirement, and (d) the government should provide sufficient subsidy for tenure, additional education and teachers’ additional workload.

Policy making issues suggestions included: (a) there should be consistent policy making at a certain period with clear goals, (b) some limitation should be placed on new schools’ growth, (c) clearly distinguish the difference between the university system and technological institutions, (d) establishing an idea that a diploma is not the only thing necessary for higher education, (e) offer teachers opportunities for continuing education and lifelong learning, (f) encourage teachers to attend academic conferences, (g) improve the quality level of classes and departments, (h) strengthen administrative management, (i) improve the small group teaching system, (j) establish a student placement mechanism, (k) reduce teachers’ counseling workload and teaching hours, and (l) increase percentage of educational budget allowance.

Human personality education suggestions included: (a) increasing ethical and moral education classes, (b) offering liberal arts credits, (c) establishing basic life education program, (d) cultivating international point of view, providing communication skills learning, and (e) integrating cooperation with international business and professions.

Research environment issues suggestions included: (a) increase facility and research equipment, (b) improve publication, (c) enhance promotion mechanism, (d) differentiate between research and teaching, (e) offer sufficient space, and (f) create a research and development mechanism.
Others issues suggestions included: (a) cultivating a common sense approach to educational reform, (b) building multiple resources from outside of schools, (c) recruiting qualified practical masters, (d) enhancing holistic education, (e) improving communication between parents, schools, and students, (f) respecting professional technicians who do not hold a diploma, (g) establishing human resources pre-warning system, and (h) establishing their own promotion mechanism for technological and vocational education systems.

Statistical Results

*Predictability of HTVE Reform*

For the purpose of determining the criterion variable of positive or negative perception of HTVE reform, respondents were categorized as having a positive attitude toward educational reform if they answered positively 60% or more of the questions in each domain. This provided a dichotomous variable reflecting positive and negative perception of HTVE. Table 28 indicates the results of this categorization by domain.

Table 28

*The Frequencies and Percentages of Three Positive Answers toward Each of Five Domains*

<table>
<thead>
<tr>
<th>Domain</th>
<th>Instructors’ Attitudes</th>
<th>Instructors’ Quality</th>
<th>Students’ Quality</th>
<th>Pedagogy</th>
<th>Information Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>209</td>
<td>271</td>
<td>57</td>
<td>262</td>
<td>279</td>
</tr>
<tr>
<td>Percentage</td>
<td>42%</td>
<td>55%</td>
<td>11%</td>
<td>53%</td>
<td>56%</td>
</tr>
</tbody>
</table>
Discriminate Function Analysis (DFA) and cross tabs were utilized in order to provide statistical information necessary to address the null hypothesis. First, DFA was used to calculate the predictability of instructors’ attitudes toward educational reform, their perceptions of teaching quality, students’ quality, pedagogy, and technological utilization following the implementation of higher technological and vocational education reform in Taiwan. For this analysis, the predictor variables were the demographic variables gathered in the survey. These calculations determined that the demographic variables, that is: age, years of teaching experience in higher education, years of teaching in the present institution, class size, number of classes taught, and advising load all failed to serve as important and/or consistent predictors of positive or negative attitudes of the criterion variables listed herein at an experimentally important and/or consistent level.

Descriptive Analysis

Gender, college affiliation, educational background, academic rank, additional administrative duties, and knowledge about educational reform were all analyzed using cross tabs. Based upon the proportionate distribution of respondents, differences from that proportion were calculated and are reported here. These results are shown in Table 29.

Table 29 displays the results of the analysis of responses to each of the five domains into which the survey was divided. Table 29 shows the distribution of responses to all five domains, based upon each of the cross tabulated values, the predictor variables. For example, the first variable illustrates the responses to the five survey domains of instructors’ attitude, instructors’ quality, students’ quality, pedagogy, and information technology, broken down by the demographic variable of gender. The -4% value for female attitude was calculated as follows:
The percentage of females who responded to the questionnaire was 35%, as opposed to 65% who were male. All calculations for each of the descriptive variables are derived from this base percentage. Of the females who responded to the five questions addressing attitudes toward educational reform, an average of 39% responded negatively. The difference between the base percentage of female respondents and the percentage of those who responded negatively was 4%. As the percentage of negative responses was greater than the overall percentage of female responses, the difference is in the negative direction, with a value of -4%.

Conversely, the difference between the 65% of male who responded, and the 61% who responded negatively is 4% more in the positive direction. The same procedure, using the same base percentages, is used to calculate overall gender distribution for each of the other four domains, namely instructors' quality, students' quality, pedagogy, and information technology. Since the difference between the base percentage of female respondents and the percentage of those responding negatively overall to each domain of questions is always negative, the overall percentage of females responding more negatively than positively is totaled as -24%. Therefore, females have a 24% disproportionately more negative attitude toward education reform than do male respondents. Likewise, the total percentage of male responding positively overall to education reform is 24% disproportionately more positive.

The same procedure, where a base percentage of respondents is calculated for the variable distribution of each predictor variable, is used to illustrate the disproportionate percentage of responses, if any, to each of the five survey domains. Table 29 is presented for each of the descriptive variables of gender, college affiliation, educational background, academic rank, additional administrative duties, and knowledge about HTVE reform.
Table 29

*The Distribution of Descriptive Variables by Domains*

<table>
<thead>
<tr>
<th>Descriptive Variable</th>
<th>Sub-variable</th>
<th>Attitudes Quality</th>
<th>Instructors' Quality</th>
<th>Students' Pedagogy</th>
<th>Information Technology</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>-4%</td>
<td>-8%</td>
<td>-1%</td>
<td>-4%</td>
<td>-7%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4%</td>
<td>8%</td>
<td>1%</td>
<td>4%</td>
<td>7%</td>
</tr>
<tr>
<td>College</td>
<td>Arts</td>
<td>-4%</td>
<td>-7%</td>
<td>-1%</td>
<td>-5%</td>
<td>-8%</td>
</tr>
<tr>
<td>Affiliation</td>
<td>Science/Engineering</td>
<td>4%</td>
<td>10%</td>
<td>1%</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>Business</td>
<td>0%</td>
<td>-4%</td>
<td>0%</td>
<td>-3%</td>
<td>-2%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Educational Background</td>
<td>Bachelor</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Master</td>
<td>-9%</td>
<td>-13%</td>
<td>-4%</td>
<td>-11%</td>
<td>-11%</td>
</tr>
<tr>
<td></td>
<td>EdD/PhD</td>
<td>8%</td>
<td>12%</td>
<td>4%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Academic Rank</td>
<td>Lecturer</td>
<td>-3%</td>
<td>-6%</td>
<td>1%</td>
<td>-2%</td>
<td>-2%</td>
</tr>
<tr>
<td></td>
<td>Assistant</td>
<td>0%</td>
<td>-1%</td>
<td>-1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Professor</td>
<td>2%</td>
<td>5%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Associate</td>
<td>2%</td>
<td>5%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Professor</td>
<td>1%</td>
<td>2%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Administrative Duties</td>
<td>Yes</td>
<td>1%</td>
<td>-4%</td>
<td>-1%</td>
<td>-2%</td>
<td>-2%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>-1%</td>
<td>4%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Knowledge Reform</td>
<td>Very</td>
<td>4%</td>
<td>2%</td>
<td>-1%</td>
<td>-2%</td>
<td>-2%</td>
</tr>
<tr>
<td>about HTVE Reform</td>
<td>Somewhat</td>
<td>-1%</td>
<td>1%</td>
<td>1%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Reform</td>
<td>None</td>
<td>-3%</td>
<td>-3%</td>
<td>0%</td>
<td>-3%</td>
<td>-3%</td>
</tr>
</tbody>
</table>

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Decisive and Indecisive Analysis

In the questionnaire, questions 40 and 50 addressed the same issue of students' quality, and whether students were prepared for technological changes likely to occur in the next five years. The questions were analyzed in order to evaluate differences in response patterns. The fact that the instructors responded in a strongly negative manner to both questions suggested that their responses were consistent. Table 30 represents the data from these two classes.

Table 30

Comparing the Results of Questions 40 and 50

<table>
<thead>
<tr>
<th>Questions</th>
<th>Yes</th>
<th>No</th>
<th>Uncertain</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 40</td>
<td>60</td>
<td>284</td>
<td>153</td>
<td>497</td>
</tr>
<tr>
<td>Question 50</td>
<td>146</td>
<td>344</td>
<td></td>
<td>490</td>
</tr>
<tr>
<td>Gain</td>
<td>86</td>
<td>60</td>
<td></td>
<td>-7</td>
</tr>
<tr>
<td>% Gain</td>
<td>143%</td>
<td>21%</td>
<td></td>
<td>-1%</td>
</tr>
</tbody>
</table>

Analysis of Uncertain Responses

In order to investigate the responses of questions marked 'uncertain', these descriptive findings from all questions in which participants answered with an 'uncertain' response of 34% or more of the total responses reported will be analyzed in this section. In these top ranked six questions the 'uncertain' response is a higher percentage than either the 'yes' or 'no' responses for each of these questions. These six questions had an 'uncertain' response rate of 34% or more and represented 25% of the total number of questions having a possible response of 'uncertain'. Of these six questions, five of them dealt with instructor related issues while the remaining question addressed student quality.
The question having the highest number of 'uncertain' responses was Question 48, which asked: Instructors are well prepared for technological changes during the next five years. The overall responses to this question are illustrated in Figure 1.

*Figure 1: Percent of Positive, Negative, and Uncertain Responses for Question 48*

The question having the second highest level of 'uncertain' responses was Question 43, which asked: Most teachers have been sufficiently prepared by professionals in classroom teaching. The overall responses to this question are illustrated in Figure 2.

*Figure 2: Percent of Positive, Negative, and Uncertain Responses for Question 43*

The question having the third highest level of 'uncertain' responses was Question 35, which asked: Returning to additional education will improve [the] instructors' teaching abilities. The overall responses to this question are illustrated in Figure 3.
The question having the fourth highest level of 'uncertain' responses was Question 47, which asked: Instructors have improved their computer skills. The overall responses to this question are illustrated in Figure 4.

The question having the fifth highest level of 'uncertain' responses was Question 37, which asked: The HTVE reform has sufficiently prepared students to meet the needs of changing society. The overall responses to this question are illustrated in Figure 5.
The question having the sixth highest level of 'uncertain' responses was Question 41, which asked: The HTVE reform has improved instructors' pedagogies. The overall responses to this question are illustrated in Figure 6.

By contrast, it was also important to analyze the 'uncertain' responses for questions having the lowest number of 'uncertain' responses. The lowest 25% of the 'uncertain' responses involved analyzing six questions. Four of these six questions dealt with instructor related issues while the remaining two dealt with student issues.

The question having the sixth lowest level of 'uncertain' responses was Question 44, which asked: The HTVE reform has promoted instructors' utilization of new skills. The overall responses to this question are illustrated in Figure 7.

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The question having the fifth lowest level of 'uncertain' responses was Question 39, which asked: Students’ preparation for class has been improved. The overall responses to this question are illustrated in Figure 8.

The question having the fourth lowest level of 'uncertain' responses was Question 31, which asked: Overall, instructors’ quality has improved since the initiation of the HTVE reform. The overall responses to this question are illustrated in Figure 9.
The question having the third lowest level of 'uncertain' responses was Question 33, which asked: The HTVE reform has motivated instructors to do research in their fields. The overall responses to this question are illustrated in Figure 10.

The question having the second lowest level of 'uncertain' responses was Question 51, which asked: Information technology will result in better academic achievement for students. The overall responses to this question are illustrated in Figure 11.
Figure 11: Percent of Positive, Negative, and Uncertain Responses for Question 51

The question having the lowest level of ‘uncertain’ responses was Question 45, which asked: Technological pedagogy will result in better academic performance for faculty. The overall responses to this question are illustrated in Figure 12.

Figure 12: Percent of Positive, Negative, and Uncertain Responses for Question 45

Summary of Uncertain Responses Quartiles

Finally, the first and fourth quartiles of uncertain responses were paired with the absolute value of the differences between the reported positive and negative responses to the respective questions. These results are shown in Table 31.
Table 31

*The Percentages of Uncertain Responses Quartiles*

<table>
<thead>
<tr>
<th>Question/Quartile</th>
<th>% Uncertain</th>
<th>% Pos - % Neg</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Q48) 1&lt;sup&gt;st&lt;/sup&gt; Quartile</td>
<td>48%</td>
<td>2%</td>
</tr>
<tr>
<td>(Q43) 1&lt;sup&gt;st&lt;/sup&gt; Quartile</td>
<td>41%</td>
<td>9%</td>
</tr>
<tr>
<td>(Q35) 1&lt;sup&gt;st&lt;/sup&gt; Quartile</td>
<td>36%</td>
<td>22%</td>
</tr>
<tr>
<td>(Q47) 1&lt;sup&gt;st&lt;/sup&gt; Quartile</td>
<td>36%</td>
<td>26%</td>
</tr>
<tr>
<td>(Q37) 1&lt;sup&gt;st&lt;/sup&gt; Quartile</td>
<td>34%</td>
<td>38%</td>
</tr>
<tr>
<td>(Q41) 1&lt;sup&gt;st&lt;/sup&gt; Quartile</td>
<td>34%</td>
<td>12%</td>
</tr>
<tr>
<td>(Q44) 4&lt;sup&gt;th&lt;/sup&gt; Quartile</td>
<td>23%</td>
<td>59%</td>
</tr>
<tr>
<td>(Q39) 4&lt;sup&gt;th&lt;/sup&gt; Quartile</td>
<td>22%</td>
<td>55%</td>
</tr>
<tr>
<td>(Q31) 4&lt;sup&gt;th&lt;/sup&gt; Quartile</td>
<td>21%</td>
<td>44%</td>
</tr>
<tr>
<td>(Q33) 4&lt;sup&gt;th&lt;/sup&gt; Quartile</td>
<td>17%</td>
<td>49%</td>
</tr>
<tr>
<td>(Q51) 4&lt;sup&gt;th&lt;/sup&gt; Quartile</td>
<td>16%</td>
<td>66%</td>
</tr>
<tr>
<td>(Q45) 4&lt;sup&gt;th&lt;/sup&gt; Quartile</td>
<td>10%</td>
<td>76%</td>
</tr>
</tbody>
</table>

A simple linear regression was conducted on these results and provided a Pearson r-value of -.94, an adjusted $r^2$ of 87% (p-value < .0001, based upon an F-value of 77), and a predictor equation of: $U = -45\% (D) + 45\%$, where $U$ is the percentage of uncertain responses and $D$ is the absolute value of the difference in the percentage of positive and negative responses (p-value < .0001). The p-value for the constant, 45% was also less than .0001.
Summary

This chapter presented the data collected through a survey of higher technological and vocational education (HTVE) instructors in the central district of Taiwan and the statistical analysis thereof. The questionnaire was part of a study designed to determine instructors' perceptions of the results of HTVE reform and to analyze their view of their own roles following these reforms since the implementation of HTVE reform in 1996. The total number of returned questionnaires was 497 copies out of the 750 sent to the nine institutions granting permission to participate, resulting in a 66% return rate. These findings were made in order to ascertain information from higher education instructors regarding their perceptions of the state of HTVE reform in Taiwan. In order to answer both parts of the research question, the questions (Q13-51) were divided into two sections, one which consisted of the questions concerning respondents' perceptions of the progress and success of HTVE reforms, and one which consisted of the questions concerning the instructors' perceived roles in the reforms. In addition, a summary and synthesis of the narrative responses by instructors to questions 28, 29, and 30 were presented separately.
CHAPTER FIVE
DISCUSSION AND SUGGESTIONS

Overall Perception

The general question posed by this research was how higher technological and vocational education (HTVE) instructors perceived the progress and success of Taiwan's HTVE reform, and how they perceived their own role within that reform. Based upon the domains of instructors' attitudes, instructors' environment, leadership, instructors' workload, instructors' quality, students' quality, pedagogy, and information technology, there was a 55% positive overall response, across all indicators (Q 13-51), regarding the educational reform in Taiwan. However, when decisive responses were analyzed, it was found that 67% of those responses were positive toward the educational reform. When all respondents were considered as a whole, the instructors' perceptions were modestly positive. However, when those respondents who were considered decisive made a decision regarding educational reform, the result was a strong positive perception.

In the second half of the study, a much larger percentage of instructors considered their own roles a very important contribution toward the progress and success, or failure of Taiwan's HTVE reforms. These instructors appeared to be very dedicated to their profession, willing to contribute an increased amount of time and effort toward research, willing to acquire additional education themselves, teaching, counseling/advising students, and services, in order to ensure the progress of their mission. The data collected regarding instructors' belief in the importance of the new requirements of research, additional education, teaching, advising, and services were strongly positive. Instructors believed overwhelmingly that research and additional education (93% and 91%
respectively) were very important and necessary for the success of educational reform. In fact, instructors also responded very positively to the necessity of the other three requirements of educational reform, i.e., teaching, advising, and services (85%, 77%, and 73% respectively). These data indicated that there was a high level of agreement between the instructors' belief in the importance of additional workload requirements and that of the educational reform act.

However, these data also indicated that instructors widely perceived themselves as having a substantially increased workload for which they were under compensated. Instructors not only agreed that the additional workload was necessary, but also that they were willing to cooperate in meeting the new expectations. The agreement between expectations of Taiwan's government and the instructors was a very positive finding, and one that can be expected to contribute to accomplishing the goals of educational reform. But it is equally important to note that instructors believed that additional compensation, on the average of $1500 US per month, was appropriate for the extra time and commitment extended in order to implement these requirements.

Null Hypothesis

The null hypothesis was analyzed in order to see if the positive or negative perceptions of the respondents were predictable based upon various predictor variables. This research found no important or consistent predictability of instructors' attitudes, instructors' teaching quality, students' quality, pedagogy, and technological utilization using instructors' age, years of teaching experience in higher education, years of teaching in the present institution, class size, number of classes taught, and number of advising students per year; therefore, this research data failed to reject the null hypothesis.
While there existed a very strong level of positive perception regarding HTVE reform among the decisive respondents, that level of support (or lack of positive perception) was not predictable based upon a multitude of predictive factors. This finding also added to the positive reception of the higher education reform by instructors of HTVE. That was, positive support was not predictable based upon age, years of experience in higher education, years of teaching in the present institution, class size, number of classes taught, and advising load. This suggested that HTVE reform has general and universal acceptance from instructors without regard, for example to their age. Any concern for specific age groups being resistant to HTVE reform was not found in this research. This was true of all other groups used as predictor variables herein.

Further Analysis of Eight Domains

The following sections present detailed information of the analysis of this study based on questions 13-51 and divided into eight domains: instructors' attitudes, instructors' work environment, leadership, instructors' workload, instructors' quality, students' quality, pedagogy, and information technology in relation to the research question. Owing to the null hypothesis, this research used five of the eight domains: instructors' attitudes, instructors' quality, students' quality, pedagogy, and information technology as criterion variables; therefore, these five domains are named primary domains, the remaining three: instructors' work environment, leadership, and instructors' workload are named sub-domains.

Primary Domains

These five domains include instructors' attitudes, instructors' quality, students' quality, pedagogy, and information technology.
Instructors' Attitudes

Respondents were strongly positive as to whether reforms were based on solid principles, while the responses were slightly negative regarding the research basis for the reforms, with 2% more negative responses than positive. Instructors were more negative when asked if the reforms have had a positive influence on Taiwan’s future, with 13% more unfavorable responses. In addition, instructors were even more concerned as to whether they were adequately compensated, with 53% more negative than positive regarding adequate compensation. However, although instructors were unconvinced that reform was based on good research and addressed the common good of Taiwan, they still have not considered an early retirement. There was a very strong positive attitude on the part of instructors toward remaining in education and serving the national education goals. However, the majority of the negativity was found in the fact that educational reform has mandated uncompensated yet increased workloads. In spite of negative attitudes toward compensation, instructors were willing to continue to work as educators. The overall score of 0% on attitude was based on the fact that the elements contributing toward a positive attitude were balanced by those contributing to a negative attitude. Their attitudes, as a whole, were equally divided between positive and negative in this domain. The results are shown in Figure 13.
Figure 13: Percent of Positive/Negative Responses of Decisive Answers toward Instructors’ Attitudes from Questions 13-17

Interpretation. Overall, the perception of this domain is that there was equilibrium between positive and negative responses. The responses of question 13 indicated that the reforms mandated by the Ministry of Education in 1996 were already having a positive influence, having been based on solid principles, leading to the HTVE reform. It certainly can be sure that vocationalization has been an important trend in higher education in Taiwan. Although, there were institutional differences, the solid educational principle of technological and vocational education will continue to influence the development of Taiwan’s higher academic systems and institutions. This perception would seem to be supported by Altbach (1991), who stated that higher education was being designed to meet specialized needs and serve specific populations. However, the slight negative responses from question 14 indicated that the respondents thought that the massive and rapid expansion of Taiwan’s HTVE reform was not based upon good research, and
question 15 indicated that the respondents thought Taiwan’s HTVE reform has not achieved a positive common good for Taiwan at this time. It is possible that Taiwan’s HTVE reform has not had sufficient time to achieve a positive good for Taiwan’s future. The insufficient time element may be why instructors were negative in responses to this question. These findings however do reflect previous literature which stated that the speed with which the United Kingdom was attempting higher education reform was one of the reasons for the negative result they experienced (Gombrich, 2000). It is interesting to note that although the majority of instructors were dissatisfied with the uncompensated workload addition since education reform, a large number of instructors showed that they have not considered early retirement. The possible reasons for this are they have enjoyed working in a harmonious environment or, more likely, instructors continue to enjoy a prestigious social status in Taiwan’s society. In addition, consideration must be given to the fact that both a lack of a sound pension system and the current economic recession does not make early retirement or seeking other jobs such an attractive option.

Instructors’ Quality

Instructors believed that teaching quality has been impacted in a strongly positive direction since the implementation of HTVE. This was most strongly revealed in the instructor’s responses toward research in their fields, where 59% more instructors had a positive attitude than a negative response toward conducting research in their fields. In addition, a very strong positive belief was expressed by 55% more instructors, than those holding negative views, toward improved teaching quality since HTVE reform. The remaining three questions in this domain also evinced overall positive answers concerning the contribution of research to the improvement of educational reforms, as
well as the necessity for further education, and the necessity of attracting qualified people to the educational field. Over the entire domain of instructors’ quality, the overall average response was 45% more positive than negative, indicating that instructors generally believed reforms have resulted in improved instructors’ quality. The results are shown in Figure 14.

Figure 14: Percent of Positive/Negative Responses of Decisive Answers toward Instructors’ Quality from Questions 31-35

Interpretation. Overall, an average of 45% more instructors thought that they have improved their teaching quality. Taiwan’s HTVE reform attempted to create more opportunities for people to participate in higher education. This perception would seem to be supported by Altbach’s (1991) findings that higher education was being designed to serve specific populations. Therefore, since the implementation of Taiwan’s HTVE reform, many well-qualified people have sought to enter the educational field to contribute their professional knowledge. More importantly, since the implementation of Taiwan’s HTVE reform in 1996, every higher education institution has been asked to
mandate appraisal assessments of all instructors. The requirement by the Ministry of Education of increased workloads provided more opportunities to broaden instructors' abilities and also to encourage instructors to adapt to a broader vision and new academic perceptions. The increased workload included the five areas: research, additional education, teaching, counseling/advising students, and service, each of which contributed to an increased depth of quality in instructors' performance. Although there have been changes to requirements, the participants strongly agreed there has been no compensation for additional workload. Yet, the responses in this domain indicated that the reforms mandated by the Ministry of Education in 1996 are having a positive impact on instructors' perception of the quality of education.

Students' Quality

Respondents answered five questions about the perception in students' quality following educational reform. The average of the five responses indicated that 58% more instructors are negative than positive regarding students' quality as a result of reforms. An overwhelming 70% more of instructors had a stronger negative attitude than positive, regarding students' preparation for class and 65% more instructors negatively saw students' preparedness for technological changes during the next five years. In addition, the majority (63%, 59%, 34%) of instructors differed in their willingness to note an improvement in students' academic performance, their preparation for changing society needs, and whether students were more motivated, respectively. Overall, instructors perceived a lack of student quality since the implementation of the HTVE reform. The results are shown in Figure 15.
Interpretation. Overall, on the average 58% respondents were more negative than positive regarding students’ quality. This was a critical sign for Taiwan’s higher education. Since the HTVE reform, students’ number increased, allowing more students who were not as well prepared to enter higher education. These phenomena including the rapid and massive higher education reform policy made by the Taiwan Ministry of Education was perceived by instructors of HTVE to have increased enrollment of students who were not prepared for higher education and as a result, the students’ quality has declined.

Students’ performances and attitudes may not immediately affect a change in higher education; however the education reform can begin to stress the need and desirability to achieve a high level of academic scholarship (Spinelli, 1981). Educational reform, to be successful must require that entering students are prepared and can successfully complete at rigor demanded in education and complete the course of study.
Pedagogy

Overall, 44% more instructors were strongly positive regarding pedagogy since the initiation of educational reform. An astounding 85% more instructors thought their technological pedagogy will result in better academic performance and 75% more instructors thought reform had promoted new pedagogical skills. It was good to see that instructors have utilized new pedagogical skills since the implementation of HTVE reform. In addition, 61% more instructors stated that instructional improvement has contributed to students' learning and 17% more thought that instructors' pedagogy has improved. However, 16% more instructors thought themselves to be insufficiently prepared in classroom teaching skills. Instructors did not believe that they were being adequately prepared for the requirements of educational reform. The results are shown in Figure 16.

Figure 16: Percent of Positive/Negative Responses of Decisive Answers toward Pedagogy
from Questions 41-45

![Bar chart showing percent of positive/negative responses to questions related to pedagogy improvements.](image)
Interpretation. Overall, 44% more instructors thought that they had improved in their technological pedagogy since the implementation of educational reform. However, instructors did not believe that they had had sufficient preparation to acquire professional pedagogy to meet the requirements of the educational reform, according to question 44. While Taiwan's Ministry of Education did demand inservice professional pedagogy training, specifically for high school teachers, there was to date insufficient inservice training available to instructors in higher education. Thus, much of the improvement in instructors' quality has come about via experience gained through increased workloads, as well as individual effort that was stimulated by the new vision for an improved educational system. For the remaining questions, instructors indicated that they have gained new knowledge and skills in this domain. By noting they lacked sufficient preparation of pedagogy, instructors are suggesting they would benefit from additional professional development. Therefore, this data suggest that if the government provides additional funding and opportunities of professional development for instructors in higher education institutions. The instructors will participate while heartedly and will begin to be well-prepared in this area of pedagogy.

Information Technology

Respondents answered six questions about the perception in information technology. An overall percentage of 34% more instructors were positive than were not positive about information technology. An overwhelming statement by 79% and 70% more instructors, in question 49 and 51 stated that technological knowledge could result in better academic achievement for students, and improved a school's competitive position. A very strongly positive belief was expressed by 53% more instructors, than
those holding negative views, toward increased technological skills as the result of educational reform, and 42% more instructors thought that reform has increased their utilization of information technology. An interesting fact gleaned from the data is that only 2% more instructors believed that they were well prepared in technological changes for the next five years.

However, more than 40% of instructors did not believe Taiwan’s students were being well prepared for the future. In question 40, 65% more instructors answered that students were not well prepared for the technological changes during the next five years, while 40% more instructors answered the same in question 50. The exact number of responses was different, but the respondents clearly indicated that instructors had a strong negative response concerning students’ technological preparedness and thought students were not being well-prepared to utilize technology. The results are shown in Figure 17.

*Figure 17: Percent of Positive/Negative Responses of Decisive Answers toward Information Technology from Questions 46-51*
Interpretation. Overall, on the average 34% more instructors thought that they have already gained improvement in their technological knowledge and skills. In fact, instructors were very positive about the idea that their technological skills have improved, and thought that their capabilities have certainly improved their schools' ability to compete as well. However, when question 48 required a response from those taking the survey, the changes were not specified in the question, and therefore it was not surprising that the responses were evenly divided between positive and negative. This division may be indicative of a lack of clear understanding for the immediate changes in the Taiwan's technological education system, or ambivalence in instructors concerning the outcomes of the educational system in the next five years. The responses to question 50 and question 51, when viewed together, seemed to contradict each other. Responses indicated that, although information technology would result in better academic performance on the part of students, their current technological education is still viewed in a negative manner. This failure of technological preparedness may be due to the instructors' lack of sufficient professional development and training. Again, Taiwan's Ministry of Education should consider providing more effort and financial support for professional development of technological pedagogy for HTVE instructors in order to enhance their qualification and to strengthen the students' preparation for the future. Consequently, both instructors and students will be able to improve their abilities and benefit from that professional development.

Analysis of Uncertain Responses of Primary Domains

In order to analyze further the responses of questions marked 'uncertain', the following percentages of positive, negative, and 'uncertain' responses for each domain are presented.
Instructors' Attitudes

Questions 13 to 17 concern instructors' attitudes toward higher technological and vocational education (HTVE) reform and their opinions on which the reforms were based. Their responses are shown in Figure 18.

Figure 18: The Overall Percent of Positive, Negative, Uncertain Responses toward Instructors' Attitudes from Questions 13-17

Instructors' Quality

Questions 31-35 summarized the questions that addressed instructors' perceptions of how HTVE reforms have improved instructors' teaching quality. Sixty-two percent of respondents thought that instructor quality has improved since the reforms and 66% percent thought the reforms have prompted instructors to do research in their field. However, only 50% of participants thought that research would improve teaching quality. Their responses are shown in Figure 19.
Figure 19: The Overall Percent of Positive, Negative, Uncertain Responses toward Instructors’ Quality from Questions 31-35

Students’ Quality

Questions 36-40 summarized the questions which addressed instructors’ perceptions of how HTVE reforms have improved students’ quality. Their responses are shown in Figure 20.

Figure 20: The Overall Percent of Positive, Negative, Uncertain Responses toward Students’ Quality from Questions 36-40

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Pedagogy

Questions 41-45 summarized the questions which addressed perceptions of how HTVE reforms have improved instructors' pedagogy. Their responses are shown in Figure 21.

Figure 21: The Overall Percent of Positive, Negative, Uncertain Responses toward Pedagogy from Questions 41-45

Information Technology

Questions 46-51 summarized the questions which addressed perceptions of how HTVE reforms have improved instructors' information technology. Their responses are shown in Figure 22.

Figure 22: The Overall Percent of Positive, Negative, Uncertain Responses toward Information Technology from Questions 46-51
Analysis of Uncertain Responses - Conclusion

Among the six questions (Q 48, Q43, Q35, Q47, Q37, and Q41) with the highest percentage of 'uncertainty', five of them dealt with instructor related issues, while the remaining one question dealt with student quality.

Interpretation

In Taiwan, the concept of what is polite, or socially acceptable may not include a definitive answer to any question. Taiwanese may provide an 'uncertain' response to direct questions in order to keep their true opinions to themselves. Therefore, respondents might not be inclined to fully answer any question about their perceptions. Specifically, instructors may not want to appear to be overconfident when questioned about their technological preparedness; for example, saying that they have improved may sound too much like bragging. All of the questions that provoked the most 'uncertainty' among instructors were concerned with technology and pedagogy. 'Uncertainty' in these two areas may indicate concern about their ability to meet the demands imposed on them due to HTVE reforms. In addition, HTVE reforms are still very recent and, therefore, it is difficult to assess preparedness for something that is still in a state of flux. Instructors may be concerned that their evaluations of performance may be based upon technology and pedagogy for which they believed they may not have been adequately prepared.

Among the six questions (Q44, Q39, Q31, Q33, Q51, and Q45) with the lowest percentage of 'uncertainty', four of them dealt with instructor related issues and the remaining two dealt with student issues.

Interpretation

Among the six questions with the lowest percentage of 'uncertainty', there was a
large positive (yes) response to both Question 45 (76%) and Question 51 (66%), as compared with a low number of negative (no) and ‘uncertain’ responses. While instructors were uncertain regarding their own preparation for utilizing technology in the classroom as well as student preparation in technology, the instructors were overwhelmingly certain that new developments in technology would result in improved performances for both students and faculty. Recognition of this finding has important implications for the Ministry of Education regarding the need to provide ongoing education and professional development for educators in higher education. The Ministry of Education has the assurance that providing continuing education in technology to instructors will be received by the instructors as not only needed professionally for their own personal improvement but also very important to the success of educational reform.

The Relationship of Uncertainty with Certainty

Equally important are two findings resulting from the analysis of first and forth quartile questions having, respectively, the greatest and least degree of ‘uncertainty’. The first observation is based upon Table 31, the data from which resulted in a very strong, negative correlation (-.94) between the percentage of ‘uncertain’ responses and the absolute magnitude of the difference between yes and no responses, when expressed as a percentage. That is, the more the yes and no responses were equally divided, the greater the percentage of respondents who were ‘uncertain’, or expressed in the other direction; the more the yes and no responses differed from each other, the fewer respondents were ‘uncertain’.

When this correlation was integrated into a regression equation, a predictor equation was developed in which the magnitude of the difference between positive and
negative responses was consistently (p-value < .0001) and highly predictive (adjusted $r^2 = 87\%$) of the degree to which the population of respondents expressed 'uncertainty'. A very simple but statistically reliable rule that applies to this research is if the respondents were equally divided between positive and negative responses, approximately half of the total number of respondents was undecided. For each additional one percent of differentiation between positive and negative responses, the percentage of 'uncertain' respondents diminished by one-half of a percent. Hence, a very accurate estimation of 'uncertain' response may be gained simply by the degree to which the positive and negative responses differ from each other.

The implication of this finding is substantial: 'uncertainty' among the population is highly and reliability predictable based upon the differentiation of the responses of the decisive respondents. Consequently, the more disproportionate the decisive respondents are, the greater the certitude is among the entire population. Clearly, as decisive perceptions were held by a greater percentage of respondents, those perceptions were overwhelming in agreement. This suggests a strong degree of internal validity to the responses provided for questions in this research and provides greater impetus to giving serious consideration to the recommendations contained herein.

The second observation of importance in this section is: without exception, the questions having the least degree of 'uncertainty', and hence the greatest differentiation between positive and negative responses, are strongly supportive of educational reform. That is, the strongest support for educational reform is found when 'uncertainty' is minimized. The analysis of 'uncertain' responses complements the findings from the analysis based upon their absence, i.e., based only upon decisive respondents. When
instructors minimize their 'uncertainty', they tend to strongly agree with each other and that agreement is consistently supportive of educational reform.

The implication of this specific analysis is to provide continuing education and stronger communication at all levels of leadership beginning with the Ministry of Education through presidents, deans, and chairs. Specific education and training regarding skills and knowledge necessary to the success of educational reform is still lacking as a functioning part of instruction. Further, additional communication of the vision and goals of educational reform and increased opportunities for education and training will allow individuals to increase mental framework necessary to implement HTVE reforms.

**Sub-Domains**

These domains include instructors' work environment, leadership, and instructors' workload.

*Instructors' Work Environment*

This domain is represented by questions 18-22 and was concerned with instructors' work environment. A large majority, 75% more instructors, were strongly positive about their workplace stating that their workplace promoted respect and cooperation. In addition, 65% more respondents thought that their department heads were always supportive. Similarly, 62% more respondents expressed that they had good communication channels in their work environment. In addition, the favorable responses which were expressed by the instructors indicated that a clear vision and an objective appraisal system were present in their work environment. The overall average of 52% of respondents indicated a very clear and positive opinion in this domain.
**Interpretation.** Overall, the high percentage 52% more instructors thought that they were situated in a satisfactory work environment. When referencing work environment, this study ascertained that Taiwan's higher education institutions have already provided functional communication channels for instructors. The data indicated that top management understands instructors' ideas, perceptions and needs. Therefore, instructors can more readily perform research, teaching, advising students, and service along with acquiring additional education that is required since the implementation of reforms. These improved channels of communication assisted instructors in their understanding of the purposes and importance of educational reform, but also probably helped to decrease Taiwan's HTVE instructors' resistance to change. This perception was supported by Senge (1990) who stated that, "team learning builds on personal mastery and shared vision, which allows people to be able to act together" (p. 236).

Communication between administration and faculty facilitated the new reforms to be disseminated to Taiwan's HTVE instructors who in turn accepted the increased workload requirement in Taiwan's HTVE reform. The HTVE instructors have subsequently made meaningful contributions to Taiwan's education system. Furthermore, these harmonious environments improved the quality of policy making.

**Leadership**

Response to the leadership domain questions very strongly indicated that instructors were satisfied with leadership patterns. Seventy-six more respondents stated that their department head utilized instructors' suggestions to solve problems. In addition, 87% of more instructors showed extreme interest and desire to participate in Ministry of Education policy making. Instructors suggested that the implementation of HTVE reform
should be facilitated, or accomplished, through mandate, and leaders must ensure that HTVE reforms were implemented as they were intended. Instructors’ responses in this study showed an extremely positive attitude toward their leadership, with an overall average 82%.

_Interpretation._ Overall, an overwhelming 82% of more instructors indicated that they were highly positive regarding their leadership pattern. Also of note, the majority of instructors expressed their interest in participating in the policy making process of the Ministry of Education and seemed to have kept an active and enthusiastic attitude to their profession. Instructors appeared to be confident in their own decision making and were optimistic about the educational reform. The overwhelmingly positive responses may also indicate that Taiwan’s government simultaneously communicated high performance expectations, as well as confidence in their instructors’ ability to meet such expectations.

_Instructors’ Workload_

The domain of instructors’ workload clearly showed a massive increase in that responsibility of instructors. Question 25 indicated that overall, 74% of instructors thought that their workload has increased, while Question 26 showed the additional areas and hours instructors thought were necessary for successful educational reform.

There was an overall average 84% of instructors who believed that these five areas of workload increase were necessary, as opposed to the 16% of respondents that did not. Instructors responded that 27 total additional hours of workload were necessary per week to meet these new responsibilities.

Question 27, also concerning workload, identified and ranked where instructors thought their greatest increases have been. The data suggests that research was
instructors’ largest increase in workload and additional education was their second largest, followed by teaching, counseling/advising students, and service. Instructors specified that the majority of their time was expended on the tasks of highest importance. Instructors overwhelmingly stated that research, additional education, teaching, counseling/advising students, and administrative and community services were necessary for them to perform their jobs up to the benchmarks set by the reforms. Instructors suggested that a fair additional compensation for their increased workload would be $389 per week, or $1556 per month. The amount of additional work and time required of these instructors indicated how critical and important these areas were to the successful implementation of educational reform.

**Interpretation.** Overall, the average of 84% instructors thought that their workload increase was necessary. In fact, workload is a large part of instructors’ increased responsibilities under the new HTVE reforms and the majority instructors strongly believed these increased responsibilities were necessary. This workload increase included research, additional education, teaching, counseling/advising students, and administrative and community services. Although instructors thought counseling/advising students was more necessary than administrative and community services, it is important to note that they asked less increased financial compensation for counseling/advising because instructors believed that counseling/advising students was already a necessary and valuable part of their job, and crucial to students’ growth. Furthermore, instructors seemed to believe that counseling/advising students was an obligation and the responsibility of a college teacher. These perceptions would be supported by a study completed by Knight (2002). Knight (2002) stated:
They may want to be satisfied with salary levels, promotion prospects and the ways in which they are managed (hygiene factors) but they are mainly satisfied or fulfilled by the intellectual challenge of research, the joys of teaching and the emotional quality of the communities of practice in which they work (motivating factors). Psychic rewards are opportunities for fulfillment and self-actualization in the workplace are major sources of faculty motivation. (p.11)

Other Analysis

Additional analysis was performed in order to gain further understanding of the status of HTVE reform. Female respondents have a more negative attitude toward educational reform than do male, with 24% more of the overall negative perception of educational reform disproportionately represented by female respondents. An analysis of higher educational affiliation resulted in a clear distinction between the responses of those respondents from the Colleges of Arts (-25%) and Colleges of Business (-9%) representing together a 34% disproportionately negative perception of educational reform, while Colleges of Sciences/Engineering expressed a 30% disproportionately positive perception.

Respondents sorted by educational background provided an even more distinct difference between positive and negative perceptions. Those respondents with doctorate degrees were 44% disproportionately more positive toward educational reform while those respondents holding master degrees were 48% disproportionately more negative toward educational reform. When responses were analyzed by academic rank, the differences were less than when sorted by educational background. The lower two ranks, lecturers and assistant professors, combined for a 14% disproportionately negative
perception of educational reform while the higher two ranks, associates and full professors, accounted for a 14% disproportionate perception that was positive toward higher educational reform.

In the instructors’ perception of reforms in terms of adding administrative duties, there was an 8% response disproportionately negative attitude toward education reform compared with a disproportionately positive 8% among those who did not have administrative duties. Finally, the most unexpected disparity comes from responses concerning knowledge about educational reform. Results from these questions clearly showed a difference in perception based on background information. Those who had no knowledge of the reforms displayed a negative 12%, while those with some familiarity with the reform process had a positive 11% response. Instructors who considered themselves knowledgeable were comparatively neutral with a positive 1% response.

**Decisive and Indecisive Analysis**

Question 40 and question 50 asked essentially for the same information. Question 40 provided three possible choices - yes, no, or uncertain, while question 50 presented two options - yes or no. The indecisive respondents change their ‘uncertain’ responses to 56% positive, 39% negative and 5% no responses were 6.8 times more likely to favor a yes response than a no response when not given the choice of opting out. The 1% of the indecisive respondents would not respond at all when not given the choice of opting out. When required to make a decision, 146 (42%) respondents were added to the decisive total.
Summary

According to the findings of this study, there was a 55% positive overall response across all indicators (Q 13-51), divided into eight domains, to the Taiwan’s HTVE reform. However, when decisive respondents were removed for analysis, it was found that 67% of those respondents who made a yes or no decision were positive toward the educational reform. When all respondents were considered as a whole, the instructors’ perceptions were modestly positive, whereas when those respondents who had made a decision regarding the educational reform were considered, the result was a very strong positive perception. Following domains considered will be listed and summarized from the least to the most positive indicators.

Summary of Eight Domains

The first domain (Q 13-17) which was designed to determine instructors’ attitudes toward reform showed an average 0% difference between respondents who approved and those who disapproved of the results. The domain represented by (Q 46-51) indicated that 34% more instructors were positive about their contributions to information technology in the current reforms. In the domain of pedagogy 44% more instructors, indicated that their pedagogy (Q 41-45) had improved as a result of the reform, while in instructors’ quality (Q 31-35), 45% more instructors thought their teaching quality had improved than those who thought otherwise. Respondents were strongly positive about their work environment (Q 18-22) with 52% more respondents approving of their work environment than not. A large number with 74% of instructors reported an increased workload (Q 25-27), there was an overall positive response to their own workload and influence on their students. An overwhelming number, 82% more respondents, approved of their
institutional leadership (Q 23-24) than those who did not. The only exception was that 58% more respondents did not indicate a similar improvement in student quality (Q 36-40), as a result of the educational reforms. Instructors seemed to perceive themselves as being responsible for the success or failure of the reforms, as they were compelled to put in more time and effort to bring both of their own and their students' skills up to the necessary standards.

In response to the instructors' perceptions toward HTVE reform based on the null hypothesis, the five domains of instructors' attitudes, instructors' quality, students' quality, pedagogy, and information technology were the domains that needed to be further summarized. The comparison of instructors' perceptions toward instructors' attitudes, instructors' quality, students' quality, pedagogy, and information technology are shown in Figure 23. The data indicated clearly that there were quantitative improvements in instructors' quality, pedagogy, and information technology, with a definite negative evaluation of students' quality, while the positive and negative responses concerning attitudes were balanced. It was notable that if there was important in the instructors' perception of students' quality, the positive perceptions of instructors regarding HTVE reform would be even stronger.
In this study the best case scenario was found: Instructors who overwhelmingly agreed with HTVE requirements and have increased their workload substantially to cooperate with educational reform. This positive attitude and positive response by the instructors toward increased workloads could be improved upon by two additional considerations from the government: a modest additional compensation to recognize the increase workload and additional funding for professional development especially in technology pedagogies.

Instructors recognized the HTVE reforms have brought an increased workload, and yet they were very willing to contribute to their professional development and to the
education field regardless whether the increased work was on campus or off. Although instructors agreed the workloads were necessary and important, they indicated a preference that sufficient compensation should be awarded to them. Instructors thought that both more work hours and increased compensation were truly necessary, following the implementation of HTVE reform.

**Summary of Other Analysis**

Since this study found no important or consistent predictability of instructors' attitudes, instructors' quality, students' quality, pedagogy, and information technology using instructors' age, years of teaching experience in higher education, years of teaching in the present institution, class size, number of classes taught, and number of advised students; there was a failure to reject the null hypothesis. It was notable that student quality received the strongest negative reaction from the respondents and was not differentiated by any of the groups within the demographic variables. All groups and subgroups of respondents consistently agreed 8% range between and within that student quality was the highest concern when considering educational reform.

Finally, a portion of the questionnaire of this study, questions 28-30, asked for input from the respondents. In question 28, instructors were asked to list any areas of workload that they believed that they may not be able to fully meet, as required by educational reform. Ninety-eight of the 497 instructors responded to this item. The responses indicated that research was the most difficult area for instructors to be able to fully meet. The next most difficult area was additional education, followed by teaching, counseling/advising students, and service. Instructors' comments reinforced the answers they had previously provided concerning issues of workload, training, and financial
support. Written responses indicated that the majority of instructors, from many different backgrounds, thought that they need more programs or professional training in order to improve their pedagogy. Respondents indicated that government should provide advanced and active policy making in order to give instructors impetus to develop their potential, and to contribute to their academic performance as referenced from questions 29-30. Additionally, the lack of financial support in purchasing facilities and equipment, and not having a well-qualified research environment, were commented on by instructors.

Research Question

The general question to be addressed by this research was: How do Taiwan’s technological and vocational instructors perceive the progress and success of higher education reform and their own role within that reform?

The Answer to the Research Question

According to this research, there was a 55% positive overall response, across all indicators (Q 13-51), regarding the educational reform in Taiwan. However, when decisive respondents were removed for analysis, it was found that 67% of those respondents who made a decision were positive toward the educational reform. When all respondents were considered as a whole, the instructors’ perceptions were modestly positive. Yet when those respondents who had made a decision were considered, the result was a strong positive perception.

In the second part of the research question, a much larger percentage of instructors considered their own roles a very important contribution toward the progress and success, or failure of Taiwan’s HTVE reforms. These instructors appeared to be very dedicated to their profession, willing to contribute an increased amount of time and effort.
toward research, acquiring additional education themselves, teaching, counseling/advising students, and services, in order to ensure progress to the mission of HTVE reforms. The data collected regarding instructors’ belief in the importance of the new requirements of research, additional education, teaching, advising, and services were strongly positive. This indicated that there was a high level of agreement between the instructors’ belief in the importance of additional workload requirements and that of the educational reform act.

However, these data also indicated that instructors widely perceived themselves as having a substantially increased workload for which they were under compensated. Instructors not only agreed that the additional workload was necessary, but also that they were willing to cooperate in meeting the new expectations. The agreement between expectations of Taiwan’s government and the instructors was a very positive finding, and one that can be expected to contribute to accomplishing the goals of educational reform. However, it was equally important to note that instructors believed that additional compensation, on the average of $1500 US per month, was appropriate for the extra time and commitment they were spending in order to implement these new requirements of institutional reform.

Suggestions and Recommendations

Instructors are the key to the delivery of effective educational reform (Lin, 2000). This investigation is a small piece in the growing body of research on the leadership role of Taiwan’s higher technological and vocational education (HTVE) reform. In order to catch up to the worldwide trend, the Taiwan’s HTVE reforms have been actively implemented since 1996 (The MOE, 2001). These reforms are intended to convert all
traditional junior colleges into institutes of technology or universities of technology.

According to the Taiwan’s Ministry of Education, this is being done to upgrade the quality of student education. One measure for promoting educational internationalization is a demand for a higher quality of instructors and more effective teaching on their part. Fundamental to these goals is that educational reform increases Taiwan’s economic competitiveness internationally. The Taiwan government believes that educational reform will play a central role in achieving economic success.

To this purpose, HTVE reform in Taiwan has been mandated by the Ministry of Education and a number of changes have been implemented. With these reforms, additional requirements for instructors included not only teaching, but also research, additional education, counseling/advising students, and administrative and community services. The new educational reforms increased instructors’ responsibilities and obligations rapidly without a commensurate increase in pay or a recognition of the work they were already performing. Instructors have been given limited time to prepare for these comprehensive changes with no financial assistance to gain the additional education. As a result, this may cause a shortage of qualified instructors, diminished educational quality, and missed economic goals. More importantly, this may cause Taiwan not only to fail to improve its economic competitiveness but worse, to lose its present place in the global economy.

The following recommendations are made on the basis of the problem statement and findings of this study in order to decrease the obstacles to Taiwan’s HTVE reform. Everyone who works in the HTVE system can make great contributions to Taiwan’s education system and society. Taiwan’s Ministry of Education will be able to use these
data to help evaluate the status of HTVE reforms. These suggestions will aid the Taiwan government’s ability to modify and improve implementation of educational reform. In addition, these suggestions will also assist educational leaders in identifying factors that are conducive to reform as well as instructors’ concerns that may be hindering reform. These recommendations include:

1. The Taiwan’s Ministry of Education could create a very strong positive attitude toward educational reform by offering resources for additional compensation to faculty for increased workload. With adequate compensation, the rating on perception would rise to a level as 70%, meeting *a priori* the experimental level determined to be important in this research. The agreement between expectations of Taiwan’s government and the instructors was a very positive finding, and one that can be expected to contribute to accomplishing the goals of educational reform. Instructors suggested that a fair additional compensation for their increased workload would be $389 per week, or approximately $1500 per month as appropriate compensation for the extra time and commitment extended in order to implement the requirements.

2. Students’ quality should be a concern to all and steps must be taken to improve students’ quality. There must be an integration of programs designed for improving the students’ quality. Since instructors thought that they have had a very positive improvement in their teaching quality, pedagogy, and information technology, they now have more tools to improve their abilities, and contribute to students’ quality.

3. Results of this study should be shared with instructors at each institution. It would be essential that instructors are made aware of the research literature which suggested the importance of the reform process. Instructors should be made aware of perceptions which
could facilitate the effectiveness of HTVE reform.

4. The implication of this study is to suggest continuing education and stronger communication at all levels of leadership beginning with the Ministry of Education through presidents, deans, and chairs. Specific education and training regarding skills and knowledge necessary to the success of educational reform is still lacking as a functioning part of instruction. Further, additional communication of the vision and goals of educational reform and increased opportunities for education and training will allow individuals to increase mental framework necessary to implement HTVE reforms.

5. Due to the fact that 'uncertain' responses occupy a high percentage, this issue must be addressed. A lack of information may be responsible, suggesting that the administration or department heads need to provide sufficient information to the instructors in order for them to understand the policies clearly. Results of this study should be shared with institutions' top administration and the Ministry of Education since the leaders typically make decisions regarding the allocation and assessment of personnel and resources. Results of this study also have relevance to administrators who often provide inservice training to an institution's staff or faculty and are instrumental regarding policy-making issues.

6. It is important that the Ministry of Education should provide and increase financial support and have appropriate training for the instructors necessary to improve the educational process. It appeared, in this study, that the means for instructors in higher education institution to obtain professional training was insufficient. It is suggested that appropriate professional development is essential toward developing both the confidence and technological skills necessary for administering the teaching environment.
7. Any further study should address the concept of whether the issues which are of importance to instructors are being included in the administrative and reform processes of an institution. These issues were mentioned many times by instructors in the comment sections. It could be that, as institutions move more toward full implementation of instructors’ concerns, there will be a positive impact on the HTVE system.

8. This study found that instructors were concerned most about workload. It is suggested that institutions, or the Ministry of Education, should encourage instructors to pursue advanced degrees and research study. The Taiwan’s Ministry of Education should propose an appropriate measurement for the goals of improving instructors’ qualifications. Resolving issues such as financial support, compensation, decreasing teaching hours or workload will allow instructors to pay more attention to their additional education and improve their professional academic study.

9. From the narrative comments, all respondents represented a desire for recognition and in particular for the Ministry of Education to encourage those instructors who are highly motivated. Institutions and instructors want to be upgraded as they advance and achieve higher goals. A possible result from this recognition could be that obstacles and hindrance of HTVE reform will be decreased and an increase in educational quality.

*Implication for Further Research*

Continued research in the area might include a qualitative study of a sampling of instructors in which the behaviors of the instructors could be explored in a contextual process. Of specific interest may be an investigation into how perceptions differ between instructors in both university system and institutes of technology. Particular emphasis could be placed on the relationship between gender, school size, number of instructors
and the percentage rate between instructors and students of HTVE system. Further topics of interest include: the different perceptions of instructors with regard to different demographics and characteristics, and how instructors increase motivation to handle the increased workload required for HTVE reform.
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Appendices

Cover Letter and Questionnaire
April 6, 2004

Dear Instructor:
I am a candidate in the Department of Leadership and Counseling at The University of Montana-Missoula in the United States of America. My doctoral dissertation research has been under the direction of Dr. Farrier. As you know, higher technological and vocational education (HTVE) reform in Taiwan has recently attracted many educators’ attention in terms of its influence on students and also on faculties. The Taiwan Ministry of Education suggests that HTVE reforms promote a greater emphasis on quality education, and also stress excellence in teaching.

This survey questionnaire will be used to determine your attitude in general toward educational reform, the workload requirements required by educational reform, and your perception of the status of educational reform. I am requesting that you complete the enclosed questionnaire. The questionnaire will take you approximately 20 minutes to complete. Please place the completed questionnaire into the envelope provided, and place it in your campus mail by April 26. Your decision to take part in this research is entirely voluntary. If you choose not to participate in this survey, please place the questionnaire into the envelope provided, and place it in your campus mail by April 26. Additionally, if there are any questions you don’t choose to answer, please complete the rest of the questionnaire and submit it as instructed. Please do not write your name or any other identification on the questionnaire or on the envelope provided. The questionnaire is not coded in order to ensure anonymity and consequently, your responses will be completely anonymous. All of your responses will be entered into a computer database without any identification of the respondent or the institution.

This research has been approved by The University of Montana-Institutional Review Board. I appreciate greatly the contribution of your valuable time to complete and return this questionnaire. My hope is that you will find it both therapeutic and valuable to express your opinions and concerns about these issues.

If you have any questions, please do not hesitate to email me at: choi823@yahoo.co.uk or call me at 1-(406) 5426695.

Sincerely Yours,
Frances Feng-mei Choi Chang

Doctoral Student of the Department of Leadership and Counseling
The University of Montana-Missoula
Higher Technological and Vocational Education Reform in Taiwan
Questionnaire

Please complete the following information
1. Age: __________ years old
2. Years of teaching in higher education: __________ years
3. Years of teaching in this institution: __________ years
4. Average class size this year: __________ students
5. Number of classes taught this year: ________ classes
6. Average number of students advised this year in addition to your regular teaching: __________ students

Please circle the correct responses
7. Gender: Female Male
8. College affiliation: (a) Liberal Arts (b) Science/Engineering (c) Business or (d) Other ________________
9. Educational background (Highest level completed): (a) Bachelor (b) Master (c) EdD/PhD
10. Academic rank: (a) Lecturer (b) Assistant professor (c) Associate Professor (d) Professor
11. Do you have additional administrative duties: Yes No
12. How knowledgeable are you about the higher technological and vocational education reform? Very Somewhat None

Please circle the responses you believe best describe your perception
13. Do you believe higher technological and vocational educational reform was based upon solid educational principles? Yes No Uncertain
14. Do you believe higher technological and vocational educational reform was based upon good research? Yes No Uncertain
15. Overall, do you think higher technological and vocational education reform has achieved a positive influence for the common good of Taiwan? Yes No Uncertain
16. Do you believe additional financial compensation would motivate instructors to make greater contributions to student learning? Yes No Uncertain
17. Have you considered an early retirement since the implementation of the educational reform? Yes No
18. Do you believe your institution's mission and vision are realistic, clear, and attainable? Yes No
19. Do you think performance appraisals in your institution are based on clear and objective standards?  
Yes  No

20. Do you think your department head has generally been supportive of the faculty?  
Yes  No

21. Do you generally communicate well with your department head about your needs in teaching, research, service, or counseling students?  
Yes  No

22. Do you think your work environment promotes cooperation and respect among colleagues?  
Yes  No

23. Does your department head utilize employee suggestions in solving organizational problems?  
Yes  No

24. Do you think faculty should be invited to participate in the Ministry of Education’s policy-making?  
Yes  No

25. Has your workload increased since the implementation of the educational reform?  
Yes  No

26. Please indicate with an N any areas you believe are Necessary for successful educational reform, and indicate with a U any areas you believe are Unnecessary to educational reform. Also, please list after each area the approximate average number of additional hours per week, if any, that are now required of you as a result of educational reform.

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<th>Research</th>
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<th>Teaching</th>
<th>Counseling/Advising students</th>
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27. If you circled Yes to question 25, please indicate all areas in which your workload has increased by ranking the following beginning with the numeral 1 to denote the area that has had the greatest impact upon increasing your workload and then continuing through all items you wish to identify and rank as contributing to an increased workload. Do Not rank any areas that have not increased your workload. Also, if you believe additional compensation is appropriate for any of the factors increasing your workload, please indicate to the right of that area an approximate amount that you believe would be satisfactory compensation for that area.
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28. Please list any areas of workload that you believe you may not be able to fully meet as required by educational reform.

__________________________________________________________

29. What do you believe to be the major obstacles, if any, in achieving new higher technological and vocational education goals? Please specify:

__________________________________________________________

30. Please list the three things that could best improve the quality of Taiwan's higher education:

1. ____________________________________________________________________________________________________

2. ___________________________________________________________________________________________________________

3. ___________________________________________________________________________________________________________

Based upon the perception of your experience, please answer the following questions:

(A) Instructors' Quality

31. Do you believe the overall instructors' quality has improved since the initiation of the educational reform? Yes No Uncertain

32. Do you believe the technological and vocational education reform has resulted in encouraging more qualified people to enter the education profession? Yes No Uncertain

33. Do you think educational reform has motivated instructors to do research in their fields? Yes No Uncertain

34. Do you believe research would certainly contribute to an improvement of teaching quality? Yes No Uncertain

35. Do you believe returning to acquire additional education will improve instructors' teaching abilities? Yes No Uncertain

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(B) Students’ Quality
36. Do you believe educational reform has improved the academic performance of students in general? Yes No Uncertain
37. Do you believe educational reform has sufficiently prepared students to meet the needs of our changing society? Yes No Uncertain
38. Do you believe that students are now more motivated in their chosen fields than prior to the educational reform? Yes No Uncertain
39. Since the initiation of educational reform, do you believe students’ preparation for class has been improved? Yes No Uncertain
40. Do you think that students are well prepared for the technological changes in Taiwan that may occur during the next five years? Yes No Uncertain

(C) Pedagogy
41. Do you believe educational reform has improved instructors’ pedagogies? Yes No Uncertain
42. Do you believe instructional improvement, if any, has contributed to students’ learning? Yes No Uncertain
43. Have most teachers been sufficiently prepared by professionals in classroom teaching skills to meet the requirements of the educational reform? Yes No Uncertain
44. Do you believe educational reform has promoted instructors’ utilization of new skills to enhance their teaching pedagogies? Yes No Uncertain
45. Do you believe that technological pedagogy will result in better academic performance for faculty? Yes No Uncertain

(D) Information Technology
46. Do you believe instructors have increased their own technological skills as the result of educational reform? Yes No Uncertain
47. Do you believe instructors have improved their computer skills enough to contribute toward classroom teaching? Yes No Uncertain
48. Do you think that instructors are well prepared for technological changes in education that may occur during the next five years? Yes No Uncertain
49. Do you believe that instructors’ technological knowledge can improve a school’s competitive position? Yes No Uncertain
50. With all of the technological changes in Taiwan, do you believe students are being well prepared for the future? Yes No
51. Do you believe that information technology will result in better academic achievement for college students? Yes No Uncertain