

# Examining the Role of Transformational Leadership in Technology Adoption: Evidence from Bruneian Technical & Vocational Establishments (TVE)

Afzaal H. Seyal

Faculty of Business & Computing, Institut Teknologi Brunei, Brunei  
E-mail of the corresponding author: [afzaal.seyal@itb.edu.bn](mailto:afzaal.seyal@itb.edu.bn)

## Abstract

This pioneering study discusses the thirty-five Bruneian technical & vocational institutions of top management (principals, deputy principals, senior masters, ICT coordinators and technical administrators) leadership style with the adoption of Information and Communication Technologies (ICT). The study uses a survey approach further to indicate that the majority of the Technical and Vocational schools leaders have transformational leaders style which is related with the various uses of ICT. The correlation analysis has also shown the significant relationship between transformational leadership styles and the technology development and operational phase. Therefore, based upon the analysis some recommendations are made for the relevant authorities.

**Keywords:** Information and Communication Technology (ICT), technology leadership, technical and vocational institutions, leadership style, Brunei Darussalam

## 1. Introduction

The current developments of the Information and Communication Technologies (ICT) in academic institutions at various level of the school/colleges organizational setting has made ICT adoption and implementation a dominant and one of the most widely researched topics among practitioners and academics across the globe. Researchers have conducted several studies from various dimensions to analyze the organizational, technological, environmental and various inter-organizational and inter-personal factors that have successfully contributed to the organizational efforts to get a competitive advantage and success. Other studies had also be undertaken focus on inter-disciplinary modes to get a broader prospect such as combining organizational factors as well as top management support, IT literacy and training of the top management based on the with the personality of the managers, administrators and college and school principals' leadership styles. However, in the new millennium the organizational success of ICT implementation has been suggested that leadership style of the top management plays a dominant role affecting the organizational productivity and success (Gumusluoglu and Ilsev, 2009). It might be through the leadership style that effect on organizational characteristics such as strategy, structure, reward system and resources. Leaders can help their followers to exhibit high level of creativity at work (Shin & Zhou, 2003).

Leadership, therefore, is defined as a process whereby one individual influences a group of individuals to achieve a common goal (Northouse, 2001). If we include this definition to the school managements, we can find clearly the application of this to the principals of vocational and technical institutions where these individuals would influence the activities of organized groups such as the staff, students, policy makers and employers towards the goals of success and productivity (Boateng, 2012).

Similarly, it is true with the academic environments especially among schools where the school principals, deputy principals and technical administrators play significant roles in adopting and implementing the ICTs in the schools. Several studies in school, had investigated the leadership styles of school principals in ICT implementation. Betz (2000) had found that ICT would only be successfully implemented in schools if the principals were actively supportive and learn the knowledge of ICT as well, so this would provide adequate professional development and support for his/her staff in the process of radical change in technology for teaching/learning from the traditional pedagogical approach. Schiller (2003) concluded from their Australian-based study that school principals had the main responsibility for implementing and integrating ICT in schools. While Anderson and Dexter, (2005) had carried out a study on technology leadership behavior of school principals and found that 'although technology infrastructure is important, technology leadership is even more necessary for effective utilization of technology in schools'. Then Afshari *et al.*, (2012) studied 320 school leaders in Iran and reported that computer competence and ICT usage were key factors that influence technology leadership behavior. Tong and Trinidad, (2005) also investigated the investment in ICT for enhancing formal and non-formal education system and essential for school improvement. Similarly, various other research reports had supported that the leadership was an important factor in effective use of the technology in education (Schiller, 2003; Anderson and Dexter, 2003). We can safely presume the notion of Chang, Chin and Hsu (2008) that technology leadership behaviors are important to successful implementation of educational technology plans.

From the above statement it is evident that a school leadership is successfully linked with ICT implementation where some studies had been conducted from various dimensions. However, the research studies in Southeast Asia on the role of the particular leadership of school principals with the adoption of technology are limited. This especially true on the top leadership role of the technical and vocational colleges and to our knowledge, none is available in Brunei Darussalam. So there is a vacuum and this study will therefore not only fill-in the research gap but add new dimension to the existing knowledge. This study is conducted based upon the following two objectives:

1. To understand the dominant leadership style of the principals of TVE in Brunei Darussalam
2. To understand the relationship of dominant leadership style to the various technology adoption stages.

### 1.1 Vocational and Technical Education in Brunei Darussalam

Brunei Darussalam is a small tiny South East Asian Sultanate, country with a population of 405,938 (CIA World report, 2011). It is located on the equator at the northwestern edge of the island of Borneo, which is also a part of Indonesia and Malaysia. Its economy is based on oil and gas. Negara Brunei Darussalam (NBD) simply called Brunei, is third largest oil producer in Southeast Asia with an average production of 180,000 barrels per day. Brunei Darussalam enjoys a high quality of life with an estimated US\$31,000 per capita income, the second highest in ASEAN ([www.bt.com.bn](http://www.bt.com.bn)) with GDP of US\$12.37 billion (2010) ([www.worldbank.com](http://www.worldbank.com)). Brunei Darussalam globally, is a member of the Association of South East Asian Nations (ASEAN), Asia-Pacific Economic Council (APEC) and World Trade Organization (WTO).

Vocational and Technical Education (VTE) had been emphasized in Brunei's education system since the early days before the independence in 1984. It was formally introduced in Brunei Darussalam in 1970 with the formation of two trade schools, namely Building Trade School and Government Engineering School. Soon after the independence, the Government of Brunei Darussalam focused great attention to the Technical and Vocational education with the establishment of Department of Technical Education (DTE) headed by Director under the Ministry of Education. This technical education was revolutionized in its new education system the RKN21-a new education policy implemented in 2012. Under this DTE there are seven technical and vocational institutions that offer a wide range of full-time programs at certificate levels for the technically inclined youth. In 2003, 1063 students registered for Higher National Diplomas and certificate courses while 3878 registered for the National Diploma courses. The number of teaching staff at VTE institutions in 2004 was 830, out of which 41% were females. There were expatriate teachers make 19% of the total VTE teaching staff. In 2013, His Majesty's Titah (address) called the Ministry of Education to review vocational and technical education system in the country to stay relevant and meeting the demand of various sectors in the country. In the light of these directives, MOE has undergone a transformation of VTE, with the vision "To achieve excellence in Technical Education and training", and with the vision of "developing a competitive, dynamic and quality workforce through technical education and training consistent with its national aspirations". The major areas that have undergone were restructured included course and curriculum re-structuring, expansion of apprenticeship schemes, more progression and certification options, as well as new schemes of services and campus developments.

In addition, Southeast Asia Ministers of Education Organization (SEAMEO) Regional Center for vocational and technical education and training (SEAMEO-VOCTECH) has been set up with its main objectives to deliver and promote quality education, specifically in the field of VTET to its clients through various training programs, categorized as regular, in-country, customized and special courses.

Therefore, this paper is divided into four sections: The next section presents the review of the literature focusing on foundation of leadership, and its studies linking to leadership style with different levels of IT adoption in vocational and technical institutions. This is followed by research design, with analysis as well as a discussion of the results. Finally the paper ends with its conclusion, whereby it highlights the limitations and practical implications of this research.

## 2. Review of Literature

### 2.1 Leadership Styles and Effectiveness

Shifting from various classical leadership styles, traits and behaviors, several researchers began concentrating on finding other styles of leadership. They are classified as the transactional (TRXL) and transformational (TRFL) approaches. Bass (1985) on the basis of (Burns, 1978) ideas of transactional and transformational political leaders was among the first who made an instrument, a MLQ multi-factor questionnaire to capture responses on both TRXL and TRFL styles.

According to Burns, (1978) transactional leaders motivate their followers by exchanging rewards for the services rendered. While Kuhnert and Lewis, (1987) summarized transactional leaders as giving followers things they wanted in exchange for things leader needed. If the expectations of the leaders and the followers were in congruent with each other then the organization would be in harmony and objectives set would be met.

Bass *et al.* (1996) described the transactional leadership style as being based on traditional bureaucratic authority and legitimacy. Bass (1990) described the transactional leaders' relationship with the subordinates were in three phases: (1) he recognized what the subordinate wanted to get from their work and ensured that they got what they wanted based upon their satisfactory performances. (2) Rewards and promises of rewards were exchanged for employees' efforts and (3) the leader responded to his employees' immediate self-interest through the completion of their work. Transactional leaders were those leaders who implemented structures and understanding them towards their employees' need (Senior, 1997). Transactional leaders were more suited to stable work environments with little competition. However with the current changing environments which require a new style of leadership in order to maintain the organizational survival as well as its successful performance (Brand *et al.* 2000).

In contrast, with the above, this transformational leadership currently goes beyond exchanges and inducements for desired performance and or services. Transformational leaders would use other means of motivating their followers to be self-motivated and empowering themselves to produce unexpected performance beyond what they themselves envisaged. According to Yukl, (1998), transformational leaders build commitment to the organization's objectives and empowered followers to achieve those objectives. He cited that transformational leaders were expected to define the needs to change, create new visions and muster commitment to the vision, concentrate on long term goals, inspire followers to transcend their own interests to pursue higher-order goals, change the organization culture and mentor followers to take greater responsibility for their developments and that of others.

Transformational approaches to leadership have long been advocated as productive where evidence has suggested that transformational practices do contribute to the development of capacity and commitment (Leithwood *et al.* 1999). In another study, Sarros and Santora, (2001) concluded that staff reports of leaders behaviors are in term of three components of transformational leadership namely: charisma, individualized consideration and intellectual stimulation as well as leaders' transformational leadership style showing the relationship with staff job satisfaction, staff turnover and professional achievement.

Other studies had examined the effects of transactional and transformational leadership number in the hundreds (Bass, 1998) and still continued till today. Many of those studies had found more positive outcomes related to transformational leadership (Waldman *et al.* 1990; Seltzer and Bass, 1990; Butler *et al.* 1999; Mackenzie, 2001; Dvir *et al.* 2002; Turner *et al.* 2002; Judge and Piccolo, 2004). As seen in, Yammarino *et al.* (1993) who discovered the correlation between performance and transformational leadership. Judge and Piccolo (2004), the study concluded that the quality of the relationship between leader-subordinate relationship vary depending on which dimension of interpersonal interaction prevail. As seen in that study the relationship built on behaviors would depend on economic incentives as well as unilateral information flow from supervisor to subordinate to reveal the transactional leadership qualities. Transformational leadership qualities are distinguished by bi-directional information exchange, the leader's personal attractiveness, the leader's ability to intellectually challenge subordinates and the leader's consideration given to individual concern. Iqbal *et al.*, (2012) in his meta-analysis, had conducted research on articles concerning the leadership style, the approach and the dimension in a journal single database from 1998 till 2011 and had found that the transformational and transactional leadership were widely studied in order to identify the best possible way for leaders to interact with their followers. They further concluded that in majority of research articles, studies had shown that transformational and transactional leadership style category rank high with 43.3% of studies not only focused but also used the people-oriented leadership style (TFXL) followed by 20% of the studies using task-oriented leadership style (TRXL).

## 2.2 Leadership Style and Technology Implementation in VTE

The nature of work is currently changing as the technological solutions are being embedded in every facet of college and school levels from administration stage to the management level and towards integrating technology across curriculum for teaching/learning. Same is applied to these vocational and technical establishments which are overloaded by the increased demands publicly to produce individuals with more opportunities for present and future prospects in multiple industries which offer the individuals with enough skills for personal developments and success in the changing society (Moss and Liang, 1990).

Several studies have done on the styles of leadership by the school principals and their attitudes and roles towards ICT implementation (Ghamrawi, 2013; Boateng, 2012). Ghamrawi (2013) studied the relationship between leadership styles of Lebanese Public School principals and their attitudes towards ICT versus the level of ICT used by their teachers. They concluded that autocratic (more like TRXL) leadership style of school principal is negatively related toward the use of ICT for educational purposes. Similarly, positive correlation exists between principals' attitudes towards the used of ICT for educational purposes and level of its use by their teachers in school. Boateng (2012) conducted a study on the leadership style and effectiveness of principals in vocational and technical institutes in Ghana. They had found that principals exerted both TRXL and TRFL styles,

yet when they needed to capitalize on their influences outside the institutions to build partnerships, mobilize ideas, resources and supports for the technology implementation programs, they TRFL style would apply to have more effective leadership preferences.

These studies on the principals' leadership and ICT implementations are not new. Daughtry and Finch (1997) concluded that leaders who were more transformational and promoted a culture of followers' empowerment and collaboration were suitable for technological innovations. Yurov and Potter (2006) included that this leadership in Technology Acceptance Model (TAM), in general and post-adoption use, in particular. These studies indicated that the motivational influence of IT leaders on the intent of subordinates and employees were to provide an information used for system enhancement. They had concluded that when IT leaders displayed transformational leadership qualities that resulted with a greater intent this would allow followers to contribute to system support and enhancement. In Dawson and Rakes (2003) studies the result showed influence of principals' technology training on the integration of technology into school. They further stated that principals as transformational leaders played critical roles in successful implementation of school initiatives on technology user. Schepers, Wetzels and Ruyter (2005) also studied leadership style in TAM. Their findings indicated that TRFL style positively influence perceived usefulness of the technology, whereas, TRXL style does not display any significant effects.

Within the continuum of techno-school leadership, only a few studies have been done in Brunei. Seyal, (2007) studied the primary school principals leadership style and found that the transformational leaders were effective school leaders when faced the challenges of technology. In another study, of school teachers use of ICT, Goh and Leong, (2006) found that many teachers in Brunei had positive attitudes towards application software and the use of the Internet and CD-ROM resources in their teaching. However, when it comes to using the resources directly in classroom instructions there are reservations, barriers, and constraints of facilities and resources (Leong, 2006; Kam, 2007). Kifle, (2008) in his study of e-Government had mentioned on the strong needs of champions and leadership. These not only influenced on directing, pushing, encouraging and mobilizing but also the follows-up and monitor the implementation projects. Seyal (2012<sub>a</sub>) studied the primary school leadership in the context of demographics. In another study, Seyal (2012<sub>b</sub>) has assessed the ICT use with the leadership among ninety-six primary school administrators and found that there were only two domains such as, curriculum integration and need assessment that were found to be significant as the use of technology across curriculum was at infant stage.

As stated above, despite the important role of principals to support technology integration, there have been only a few researches on the use of ICT by the principals and their leadership role in implementing ICT in VTEs. Therefore, there is a gap in the literature write-up and this study does not only fill-in the gap but also will contribute to the knowledge to the existing theoretical findings a VTE college principals' leadership style and ICT integration in Brunei Darussalam.

### **3. Research Methodology**

#### **3.1 Design of Instrument**

The questionnaire is in three parts. Part A of the questionnaire captures the data about the demographic profile. *This questionnaire captures the respondent's demographic profile: gender, age, experience of the respondents as administrators, technology infrastructure, and how far the vocational college has implemented the ICT solution, especially for teaching/learning purposes.* Part B is to assess the leadership style and in line with the objectives of the study. It is the shorter version of Multifactor Leadership Questionnaire (MLQ-X5) from Bass and Avilio was selected to be used to conduct the research in order to assess the leadership attributes. However, the shorter version of this questionnaire is with a 9-items, version measure responses on 5-point Likert-type scale, with anchors labeled as 0= not at all to 4=frequently, if not always. The MLQ is used to evaluate how frequently, or to what degree, individuals believe that they have engaged in specific behaviors towards their subordinates. The MLQ consists of nine items grouped into three factors. The items are used to measure components of style and of the nine leadership measures, five measures transformational leadership attributes and two measures the active transactional leadership attributes and two measures the passive attribute that was excluded. After the reliability analysis we have dropped one item from transformational attributes that has lowest item-correlation (<.40). The instrument however, have seven items attributes five to measure transformational and two for measuring the transactional style. Table 1 provides the details.

#### **3.2 Technology Implementation:**

The assessment of technology level was made on two different constructs as given in Part B and C of the questionnaire. In line with the objective of the study, the Part B of instrument consists on the items as developed by Hope *et al.* (1999) and used for this research. The questionnaire includes 40-items, anchored on 5-point Likert-type scale with labeled as 1= not at all to 5=strongly agree. The forty items are grouped into five constructs to evaluate how frequently, or to what degree, individuals believe that their supervisors/administrators



engaged in forty specific categories of behaviors towards technology. In addition, the overall level of ICT use was assessed on self-reported use of the various ICT hardware, software and networking for administrative and instructional purposes and is provided in Part C of the questionnaire. The responses were grouped on five stages of ICT use such as technology initiation stage, technology development stage, technology implementation, technology fully-operational stage and finally post-operational stage. The responses were also analyzed using frequency distribution analysis to determine the extent to which principals use the ICT for administrative and instructional purposes. The items were selected by Flowers and Algozzaine (2000) and were reworded to adjust the suitability for this study.

### 3.3 Sample

Data for the study was collected in December 2013 by means of the questionnaire. The behavior perceptual items were measured by five-point scales representing a range from “Never” to “Frequently if not always”. As for the leadership style perceptual items, they were measured from “Least” to “Best”. Every effort was made to ensure an effective response rate; with the use of phone calls, covering letters and responsive questionnaires. A questionnaire survey was conducted on seven VTIs’ covering the major population. However, a total of thirty-five valid responses from vocational schools’ administrators were obtained who said that they had implemented ICT. This study is descriptive and of an exploratory nature. The target population in this study is all the administrators of seven vocational and technical institutions, located in various administrative districts of Brunei Darussalam. As the population is not homogenous and varies noticeably, so this is to sample on each one independently as in (Wiersma, 1995). However, keeping in view with the population size (35 administrators) we therefore decided to design the study based upon total population sample. The total population sampling is a type of purposive sampling technique that involved examining the entire population (total population) that has a particular set of characteristics, traits, experiences, knowledge, skills and exposures as done in (Moore and McCabe, 2005). However, Sharon (2009) had identified two aspects of examples that illustrated as when the total population sampling may be appropriate: (1) the population size is relatively small and (2) the population shares an uncommon characteristic. In our case, the uncommon characteristic is school administrators who are using ICT.

### 3.4 Instrument reliability and validity

Several techniques were used to assess the reliability coefficient Cronbach (1951) ( $\alpha$ ) and to assess face, construct and convergent validity. In order to ascertain face validity, an initial questionnaire was passed through the routine editing after it was given to the panel of experts (Academics, HR practitioners and business leaders). They were asked to respond to the questionnaire and very few comments in fact were received so some minor changes were done to enhance the clarity. Table 2 shows the reliability coefficients and convergent validity for the various constructs.

**Table 1 Inter-items correlations and AVE Table for Discriminant Validity**

	<b>IB</b>	<b>IM</b>	<b>IS</b>	<b>IC</b>	<b>CR</b>	<b>MBE</b>
Idealized Behavior (IB)	<b>0.80</b>					
Inspirational Motivation (IM)	.764	<b>0.60</b>				
Intellectual Stimulant (IS)	.589	.535	<b>0.55</b>			
Individualized Consideration (IC)	.735	.716	.779	<b>0.60</b>		
Contingent Reward (CR)	.777	.704	.613	.692	<b>0.57</b>	
Management by Exception (MBE) Active	.756	.667	.473	.624	.646	<b>0.59</b>

*All correlations are significant at the 0.01 level (2-tailed)*

*Diagonal represents average variance extracted in bold*

In general, validity refers to the degree to which this instrument truly measures the constructs for what it is intended for. There are several types of validity measures that include the face validity and constructs validity. Campbell and Fiske (1959) proposed two types of validity: convergent and discriminating validity. Convergent validity is measured by average variance extracted for each construct during the reliability analysis that should be 0.5 or 50% or better (Igarria and Iivari, 1995). Table 2 and 3 show the reliability values for the various constructs with variance extracted in diagonal. Cronbach’s ( $\alpha$ ) for the constructs ranged from 0.68 to 0.85 indicating a sufficient level of reliability and convergent validity of all constructs, excluding idealized attribute, and management-by-exception (passive). These two constructs were dropped out from the study due to the lowest ( $\alpha$ ). After filtering and further analyzing for convergent and for the discriminating validity of these six constructs, the principal component method with varimax rotation had been used to assess the variance explained. Testing discriminant validity requires checking the cross loading of items on multiple factors. All the items loaded highly on their associated constructs which would thus fulfill the Hair *et al.* (1998) criteria for adequate discriminant validity. In general results have shown that both validities are satisfied. The result for discriminant validity is provided in Table 2. However, results for factor analysis are not included here provided in order to

avoid unnecessary lengthy explanation.

**Table 2 Reliability & Validity Analysis**

Constructs	No of original items	Alpha value (.60 and above)	Mean	Variance explained <.50
Idealized Behavior	4	.78	3.20	.80
Inspirational Motivation	4	.81	3.10	.62
Intellectual Stimulant	4	.70	2.95	.55
Individualized Consideration	4	.75	3.35	.60
<b>Transformational style</b>			<b>3.15</b>	
Contingent Reward	4	.71	2.97	.57
Management by Exception	4	.73	2.88	.59
<b>Transactional style</b>			<b>2.92</b>	

#### 4. Results

Data obtained from the survey were analyzed using descriptive statistics, factor analysis as well as correlation analysis by using SPSS version 19, a well known statistical package.

##### 4.1 Background profile

The background data of individual VTE administrators, as well as their organizational profile is summarized in Table 3. Table 3 describes the characteristics of respondents. Majority (62%) is males within the age group of 36-40 years and has 6-10 years of experiences. Majority of the respondents have responded that they are at technology development and implementation stage.

**Table 3 Demographical data**

Variable	Description	Percentage
Gender	Male	62%
	Female	38%
Age	Between 25-30	3%
	Between 31-35	10%
	Between 36-40	40%
	Between 41-45	20%
	Above 45	27%
Years of experience	1-5	30%
	6-10	60%
	11-15	5%
	More than 15 years	5%
Overall technology Implementation	Technology initiation	15%
	Technology development	30%
	Technology implementation	30%
	Technological operational	20%
	Post-operational	5%

The respondents were asked to assess their responses on all six items pertaining to the two leadership attributes on five point Likert scale; 0- not at all agreed to 4-for fully agreed. After the analysis it had been found that 66% of the respondents had transformational leadership style with the mean of 3.15 as compared with mean of 2.92 of transactional leadership (34%) among the principals of VTIs.

##### 4.2 Determining the Leadership Style in Assessing Technology Implementation

In line with the principles of multivariate data analysis, we conducted a zero-order correlation between the various leadership constructs as shown in Table 4 and 5. The correlation provides directional support for the predicted relationship and shows that collinearity among all the independent variables is moderate so as not to affect the regression analysis. Tabachnich and Fidell, (1996) had pointed out that the problem of “multicollinearity” would occur at much higher correlation of 0.90 or higher between the independent variables. We conducted Pearson’ product-moment correlation analysis between the prevailing two leadership styles and five dimensions (facets) of technology integration as shown in Table 4. It is further evident that various attributes of transformational leadership are related with various dimensions of technology integration. The idealized

behavior is significant with ‘acquired experience’, whereas, inspiration motivation is significant with ‘need analyses and ‘professional development’. Similarly, the intellectual stimulation is related with ‘need analyses and finally the individual consideration is significant with ‘curriculum integration’. None of the transactional leadership is significantly correlated with any dimension of the technology integration.

**Table 4 Showing individual leadership styles and various facet of technology integration**

Leadership attributes	Curriculum integration	Perception	Acquired expertise	Need assessment	Professional development
<b>Transformational leadership style (TRFL)</b>					
<i>Idealized behavior</i>	.463	.069	<b>.001*</b>	.263	.541
<i>Inspiration motivation</i>	.195	.115	.443	<b>.047*</b>	<b>.005*</b>
<i>Intellectual stimulation</i>	.854	.178	.105	<b>.009*</b>	.468
<i>Individual consideration</i>	<b>.014*</b>	.227	.299	.151	.868
<b>Transactional Style (TRXL)</b>					
<i>Contingent reward</i>	.911	.314	.346	.162	.072
<i>Management by exception (MBE) active</i>	.205	.693	.680	.100	.834

*Bold shows p-value less than 0.05. All others are insignificant p-value of correlation coefficients*

Since Table 4 confirms the dominant leadership style, we conducted another correlation analysis to confirm the transformational leadership style with overall ICT integration to test the significance with various stages of ICT implementation at vocational institutes. Table 5 further provides directions that during the technology development stage and at operational stage, the transformational leadership style prevailed significantly.

**Table 5 showing correlation between overall ICT integration and leaders’ Transformational leadership style**

	1	2	3	4	5	6
<i>Technology initiation (1)</i>	1.00					
<i>Technology development (2)</i>	-.175	1.00				
<i>Technology implementation (3)</i>	-.131	-.167	1.00			
<i>Technology-operational (4)</i>	.424**	.538**	.403**	1.00		
<i>Technology-post operational (5)</i>	.038	.048	.036	.115	1.00	
<i>Transformational leadership</i>	.120	<b>.228*</b>	.094	<b>.190*</b>	.118	1.00

#### 4.3 Regression Analysis

In addition to the above, the regression analysis was also conducted to find out the relationship of both types of leadership style with the predictive indicators of overall ICT implementation. The result of regression analysis is presented in Table 6 as below. The model has statistically significant F-ratio and possesses moderate explanatory power as indicated by R<sup>2</sup> coefficient that shows that 40% of the variance in ICT implementation is explained by independent variables. From Table 6, it is further evident that transformational leadership is significant predictors of overall ICT implementation.

**Table 6 Hierarchical Regression Analysis for Leadership Style**

Variables	Beta	t-statistic	p-value	Remarks
Transformational leadership	.382	2.94	0.04*	Significant
Transactional leadership	-.065	-.415	.681	

*Dependent variable: Overall ICT Implementation, R<sup>2</sup> = 40%, F=8.673-statistically significant*

#### 5. Discussion

At the outset, this present study has fulfilled both of its objectives. The data analysis has further revealed that these principals’ of vocational institutions exert both types of the leadership styles; TRFL and TRXL. However, majority of them (66%) exert TRFL style compared to 34% which exert TRXL style. There exists a significant statistical difference in the mean of these two types (t= 2.85, p<.05) indicating dominance of transformational leadership.

On the other hand, despite the clear distinction between transformational and transactional leadership style, Bass (1985, 1999) has suggested that transformational leadership actually is an extension of transactional leadership where; a leader can simultaneously be both or none. In our case, since the majority of the technical & vocational college leaders exert TRFL style, so agree to Northhouse, (2010) that exhibits that transformational leadership involves an exceptional form of influence that moves followers to accomplish more than what is usually expected of them. TRFL involves the leaders moving the followers beyond the immediate self-interest through idealized influence, inspiring intellectual stimulation and individual consideration (Bass, 1999).

Transformational leadership and instructional leadership play the lead role in technology integration has been a more popular model of leadership since 1990 (Hallinger, 2007). This effective transformational leader further requires a deep understanding of oneself (Brymer and Gray, 2006). Our results, therefore, support Northouse, (2010), Afshari *et al.*, (2012) and Finley, (2014)

This study results has confirmed that all four dimensions of transformational leadership style of the principals i.e., ‘idealized behavior’, ‘inspired motivation’, ‘individualized consideration’ and ‘intellectual stimulation’ which are significant predictors of various facets of ICT integration within the context of technical and vocational institutions in Brunei. *Idealized behavior* attributes of the leadership that deals with acting and its integrity. The leaders believe on self-control, high moral judgment, optimism and self-efficacy. They are strong believers of moral and ethical consequences of their actions. The idealized behavior is significantly related to the ‘acquired expertise’ of technology integration. This idealized behavior is the charismatic view of the leaders that involve the followers in respecting and trusting their visionary leaders with an ideal attribute especially in time schools are planning to either implement or enhance the process of technology for teaching and learning purposes.

This *Inspired motivation* attribute of the leadership who inspires others, with this attribute, the inspiration leaders’ articulate, shared goals and mutual understanding of what is right and important. They use emotions to motivate the staff. This ability could inspire team members towards having good mood and indirectly affects members’ satisfaction with their leader. This attribute is significantly related to the ‘need assessment’ and ‘professional development’ stages of technology integration. This stage involves with staff training on different types of software, hardware and training on involving technology integration into curriculum, here the subordinates could get benefits of the principals’ dominant leadership style. The result shows that it supports Bamberger and Meshoulam (2000) assertion where the training and development of transformational leaders is the most viable route for organizations to pursue. Afshari *et al.* (2012) highlighted that professional development in relation to the dimensions of leadership and technology is positively related to the transformational leadership role of the principals in implementing ICT in schools. They concluded on importance of professional development in enhancing principals’ transformational leadership behavior in implementing ICT in schools. Our results also support the Dviret *et al.* (2002).

This *Individualized consideration* is when a leader shows a personal interest in the employees and their development (Bass, 1985). This attribute deals with the fundamental leadership behavior of treating individuals as important contributors to the workplace. Leaders who use this style of leadership show consideration for their workers’ needs and are prepared to encourage and coach them to achieve organizational objectives. They offer individualized supports to their subordinates, therefore a principal who demonstrates ‘individualized consideration’ as defined by the MLQ tends to significantly correlate with curriculum integration subscale on technology integration scale. This makes sense as the curriculum integration with technology is very critical stage on technology implementation. So the principals as leaders will make sure at this stage that when new technology is being embedded across curriculum in the class rooms, it must be welcomed by the instructors and teachers who would be rather skeptical and pessimistic because of the anxiety and discomfort that would associated with new technology implementation. The principals’ personal interests in their staff development would take them to technology leader and with their motivation would encourage staff to implement the technology. Our findings support the Huang (2010) and Yukl (1998) who suggested that employees would be more satisfied with their leaders who were both considerate and supportive than with leaders who were either indifferent or hostile towards subordinates.

Finally, the *intellectual stimulation* encourages innovative-thinking. The leaders with this dominant attribute focus on practices and values as well as hold high expectation for performance. They encourage new and better ways of doing things, fostering creativity, re-examining assumption, promoting intelligence rationally and problem solving (Bass, 1985). These study results have confirmed that principals who promotes ‘intellectual stimulation’ tend to rate higher on need assessment subscale of technology integration. This stage of technology integration is multi-facet and involves different stages; so the principals’ intelligence, rationality and problem-solving attribute further helps in articulating the school goals. The result here supports Chu, (2003); Schepers *et al.* (2005) who stated that the intellectual stimulation had positively influence the usefulness of the technology at the workplace.

In summary, the key indicators for these findings include encouragement, caring for and coaching of individuals. Therefore, leaders using transformational style with these four attributes can reap the benefits from technology integration and implementation which helps the management to capitalize the vocational and technical colleges’ organizational benefits especially to enhance productively. It is further noted that principals’ support and clear vision have a critical impact on technology integration process (Huang, 2010). Our results support Khan *et al.* (2009) and Imran *et al.* (2012) that all transformational leadership attributes are significant with organizational innovation.

The results of regression analysis in Table 6 also confirm the importance of transformational



leadership over transactional style on the technology implementation. Bass and Avolio (2003) suggested that ideal rating for the transformational variable should be greater than 3. This benchmark show that principals whose mean score is greater than 3 (Table 2) are very powerful in achieving the best outcome. The principals' leadership in this study meets the benchmark. In this study, we use the correlation analysis with transformational leadership style with the five stages of technology starting from technology initiation to post operational stages. Results show that transformational leadership style is significant with technology development and technology operational stage. Our results are in contrast with Shao *et al.* (2011) assertion it seems to be more practical but unfortunately it does not support our findings. They showed that transformational leadership behavior was more effective in the technology adoption phase while transactional leadership was more effective in implementation phase. Then mixed leadership style was more effective for assimilation and extension phase. This might be true to the larger country like China where the research is basically conducted. However, our work has supported Seyal & Rahman (2013) in the context of Brunei. Although it has measured the different technology in different environment with some similarities they had concluded that transformational leadership style was more suitable with ERP implementation among Bruneian SMEs.

## 5. Conclusion

The study has fulfilled its objectives where some interesting findings have emerged in leadership style of the principals/leaders of the vocational and technical colleges in Brunei. It shows that there is a statistically significant difference exists in both transformational and transactional types of leadership with more college leaders practicing the transformational style. However, the high mean score gives some indications that transformational leadership style is practiced more frequently. The previous researchers had supported that transformational leader who is associated with technology adoption, implementation organizational change and innovation. As the transformational leadership is based upon personal values and belief of the leaders, it therefore leads to the strong desire to adopt the information technology at all levels of the organizations that could provide competitive advantages.

By examining the effects of leadership style at the organizational level, our results have served to develop a comprehensive understanding of leadership style especially in deploying IT/ICT resources. It also provides useful insights to researchers and practitioners and they can use this study as a step forward for further refining the future endeavors.

*Recommendations:* This study has found that majority of VTEs principals possess transformational leadership style which is considered as conducive to face organizational challenges with the diffusion and integration of ICT across the four levels of technical colleges. However, this induction of technology brings in surmountable challenges to the college leadership. In order to lead and to perform effectively, the leader should be ready to adopt a proactive approach. The leader should not only accept the challenges relating to the accessibility and sustainability of ICT equipments, ICT support and providing equitable access to technology integration for all the stakeholders but also to focus on higher expectations of staff to-up-grade and use of ICT as a competitive advantage. They should provide professional development at all levels of the management and staff using ICT as a professional tool and capitalizing more on human resources in order to improve critical success factors. All these challenges require a new dimension of leadership-an ICT leadership. The relevant authorities at ministerial level must prioritize the policies to help vocational schools and college leadership to overcome these challenges so that the process of integration of ICT could effectively be geared up.

In addition, it is recommended that principals of vocational colleges should capitalize on their influence with active transformational leadership style to build partnership especially with the industry, mobilize ideas, resources and support for the various new programs in their respective college across the curriculum thus fostering the objectives of Vocational and Technical education in Brunei Darussalam.

*Limitations:* The study is not free from its weaknesses. The small sample size itself is big threats to generalize the results to greater extent. All data on the leadership behavior for this study came from self-report survey conducted in all the VTEs at a single point in time. It is possible that common method variance influence the results and that data collected on different time or through different methodologies could produce different results.

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