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## Leadership Styles and Technology: Leadership Competency Level of Educational Leaders

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### Abstract

Researchers have studied the leadership styles of educational leaders in connection with their level of computer use and success in integration of ICT. This study aims to reveal if the leadership style can be a predictor of competent technology leaders. The importance of this study is to investigate the leaders' competency as technology leaders rather than level of perceived use of technology, using Technology Leadership Competency Scale for School Administrators (TELÖY) (Hacıfazlıoğlu, Karadeniz, & Dalgıç, 2011) which is adapted from International Society for Technology and Education (ISTE) standards for school administrators. Fifty educators, who take leadership or administrative roles in educational institutions from the Eastern part of Turkey, completed Multi factor leadership questionnaire (MLQ) developed by Bass (1985) and translated and modified for the Turkish leaders by Demir and Okan (2008) and TELÖY. The results indicate moderate correlation between both transactional and transformational leadership styles. It is concluded that leadership style is not a predictor of competency level of technology leadership. The study contributes into literature discussing the effects of cultural differences in different countries on desired leadership styles, which in result may effect the level of technology leadership competency. In addition it also argues that leadership style characteristics cannot be used as a method to transform education and schools.

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### 1. Introduction

There have been a lot of studies invested in educational technology and integration of technology into education and research on effective use of technology in education. Governments, schools, universities and various educational institutions develop numerous policies and procedure documents focusing on technology.

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Expectations from educational leaders clearly communicate the need of effective use and integration of technology in educational institutions. However, the importance of researches combining both educational technology and educational leadership practices becomes evident only recently (Bowen, Bertoline, & Athinarayanan, 2013; Jameson, 2013).

When both technology and educational leadership was studied, researchers used various terms such as school technology leadership (Anderson & Dexter, 2000; 2005; Tan, 2010), virtual or digital leadership, online leadership, IT leadership (Hollingworth & Mrazek, 2004), leadership of virtual teams (Cascio & Shurygailo, 2003; Hambley, O'Neill & Kline, 2007), leadership of online communities (Jameson, 2011), ICT leadership (Yee, 2000), e-leadership (Gurr, 2004) or educational technology leadership (Kearsley & Lynch, 1994). The high number of terms and ambiguity between the terms signifies additional studies are required to enhance our understanding on educational leadership and educational technology. According to Tan (2010, p.902), "The prominence of ideational papers and qualitative studies indicate the infancy of this field of study, which is a potentially fertile area for research." Jameson's (2013) literature review study on e-leadership clearly reveals the limited number of studies. Jameson also argues that even though both educational leadership as an area of research field and educational technology research fields continue to grow in quantity and impact, e-leadership barely appears as a research concept. Therefore, in this paper, these two concepts (leadership styles and educational technology) are combined and studied to analyze the relationship.

## 2. Literature Review

### 2.1. Leadership and Leadership Styles

Leadership as a topic of research goes back to 1950's when trait theorists studied to find out characteristics of a successful leader. Behavioral and style theorists focused on behavior and style rather than characteristics of a person to define successful leader. Various leadership theories have been developed and leadership styles have been defined by scientists. For instance, Burns' (1978) study on Transformational Leadership Theory defines transformational leadership as reaching higher levels of motivation and morality when one or more people engage with each other, whereas transactional leaders have formal power and control and focus on short term goals. In addition, Burns introduced constructs of transforming and transactional leadership as a single continuum. On the other hand, Bass's (1985) Transformational Leadership Theory suggest Transformational and Transactional Leadership styles as two separate dimensions of leadership style even though Bass developed Multi-factor Leadership Questionnaire to measure leadership styles, takes Burns' description of transforming leadership as a conceptual basis. Bass's (1985) early study proposed seven leadership factors to conceptualize transformational and transactional leadership however after several comprehensive analysis, reviews and critiques and recommendations from researchers, Bass have reduced the amount of factors to six namely; charisma, intellectual stimulation, individualized consideration, contingent reward, management by exception and laissez-faire leadership. Another essential study investigating the relationship between cultures and leadership styles is the GLOBE study (House, Hanges, Javidan, Dorfman, & Gupta, 2004) which used 21 leadership scales initially and afterwards considering cultural clusters, reduced leadership scales to six scales and resulting six leadership styles as performance-oriented, team-oriented, participative style, humane style, autonomous style and self-protective style. Similarly Demir and Okan (2008) modified Multi-factor Leadership Questionnaire according to Turkish culture and included Charisma & Intellectual Stimulation and Individualized Consideration factors to measure transformational leadership style and Contingent Reward and Management by Exception factors to measure transactional leadership styles.

The factor's operational definitions are: (1) Charisma provides followers with a clear sense of purpose that is energizing, is a role model for ethical conduct and builds identification with the leader and his or her articulated vision; (2) Intellectual Stimulation gets followers to question the tried and true ways of solving problems, and encourages them to question the methods they use to improve upon them; (3) Individualized Consideration focuses on understanding the needs of each follower and works continuously to get them to develop to their full potential; (4) Contingent Reward clarifies what is expected from followers and what they will receive if they meet expected levels of performance; (5) Management by Exception focuses on monitoring task execution for any problems that might arise and correcting those problems to maintain current performance levels. (Avolio, Bass & Jung, 1999, pg.444-445)

Studies on leadership styles by Burns (1978), Bass (1985), the GLOBE study (House et al., 2004) and most of others did not consider leadership styles specifically for school settings. Ng (2008) argues that Transformational Leadership Theory have similarities both in school settings and in business settings however according to current literature on transformational school leadership, some researchers (Kowalski & Oates, 1993) favors Burns' (1978)

continuous spectrum of leadership styles whereas some researchers (Leithwood, 1994) favors Bass' (1985) theory in which transformational and transactional leadership styles represents opposite ends of the leadership continuum.

## 2.2. *Educational Technology and Leadership*

Few researchers investigated the effect of leadership style and educational technology in the related field. Afshari, Bakar, Luan, Samah and Fooi (2009) investigated the correlation between leadership and the use of ICT. According to the survey administered to 30 principals in Tehran, it is found that there is a strong positive correlation between transformational leadership style and computer use. Another study by Ng (2008) surveyed 80 school teachers to investigate teachers' perceptions of positive influence of transformational leadership practices on integration of ICT into teaching. Ng included eight dimensions of transformational leadership style such as developing shared vision, building consensus, individualized support, intellectual stimulation, modeling behavior, high performance expectations, strengthening school culture and building collaborative structures. The survey result supports that eight dimensions of transformational leadership could influence the integration of ICT into teaching positively.

There are numerous policy makers developing standards for students, teachers and administrators for technology competency at the national levels. On the other hand, the number of institutions developing standards for technology competency for educational administrators/leaders are limited in numbers. International Society for Technology and Education (ISTE) is one of the institutions that suggests standards for educational leaders. Hacifazlıoğlu, Karadeniz and Dalgıç (2011) used these standards developed by ISTE (2009) and created a scale to measure technology leadership competency of school administrators. ISTE Standards (formerly the NETS) for Administrators (ISTE Standards•A) are developed for evaluating the skills and knowledge of school administrators and leaders under five dimensions which are Visionary leadership, Digital age learning culture, excellence in professional practice, Systematic improvement and Digital citizenship.

The dimensions' main standards which are used in this study include: (1) Visionary Leadership. Educational Administrators inspire and lead development and implementation of a shared vision for comprehensive integration of technology to promote excellence and support transformation throughout the organization. (2) Systematic Improvement. Educational Administrators provide digital age leadership and management to continuously improve the organization through the effective use of information and technology resources. (3) Digital Citizenship. Educational Administrators model and facilitate understanding of social, ethical and legal issues and responsibilities related to an evolving digital culture. (ISTE, 2009)

## 3. **Methodology**

### 3.1. *Statement of Purpose*

The purpose of this study was to investigate the correlation between leadership styles of leaders in educational institutions measured by Multi Factor Leadership Questionnaire (Demir & Okan, 2008) and level of technology leadership competency of leaders measured by Technology Leadership Competency Scale for School Administrators (TELÖY) (Hacifazlıoğlu et al., 2011).

### 3.2 *Sample and Data Collection*

The population of this study are educators who take leadership or administrative roles in educational institutions in the Eastern part of Turkey. The sample includes 51 educators who takes leadership or administrative roles in educational institutions from the Eastern part of Turkey. During data analysis 1 sample is excluded due to incomplete answers in the questionnaire. Data has been collected from a single group of participants who attended a conference specifically for educational leaders. Participants were selected by convenience sampling method since candidates were the most convenient in terms of accessibility and availability.

This study is a correlational research under the title of quantitative research. During data collection qualitative and quantitative data has been collected using paper and pencil by a questionnaire. Questionnaire includes likert scale questionnaire items to measure leadership styles and level of technology leadership competency of leaders. In addition, qualitative data has also been collected to define leaders' role in the organization, educational background, age, gender, technological tools that they use, daily mean time of computer and internet use. Afterwards the qualitative data converted into numerical data to be investigated by statistical analysis using SPSS software package.

### 3.2.1. Instruments

Multi factor leadership questionnaire (MLQ) developed by Bass (1985) and translated and modified for the Turkish leaders by Demir and Okan (2008) is used to measure leadership style of the participants. The questionnaire includes 22 items in total, ten of the items were used to measure transactional leadership style and twelve of the items were used to measure transformational leadership style by five-point likert scale items (5:Always, 1: Never). The results of Cronbach Alpha coefficient are .81 for transformational leadership style factors and .58 for transactional leadership style factors. Kaiser-Meyer-Olkin test values are .831 for transformational leadership style factors and .712 for transitional leadership style factors (Demir & Okan, 2008).

Technology leadership competency scale for school administrators (TELÖY) is used to measure administrators' level of competency as technology leaders. The scale items includes technological leadership standards developed by ISTE (2009). The standards have been converted into four point scale questionnaire items (4: Always, 1: Never) by Hacifazlıoğlu et. al. (2011). The questionnaire includes 14 items in total, three items were used to measure Visionary Leadership dimension, six items were used to measure Systematic Improvement dimension and five items were used to measure Digital Citizenship dimension of technology leadership dimensions. The results of Cronbach Alpha coefficient (.97) indicates high reliability and factor analysis with Lambda values of the factors ranging from .73 and .88 indicates high validity of the instrument (Hacifazlıoğlu et al., 2011).

The survey, consisting four parts is used to measure leadership style and level of technology leadership competency of leaders. The first part consists of demographic questions such as age, education level, occupation, gender, daily mean time of computer use, daily mean time of Internet use and technology devices used. Second part consists of questions related to educational institutions such as location, accessibility to computers and internet by students and staff. Third part includes Multi Factor Leadership Questionnaire and the fourth part includes Technology Leadership Competency Scale for School Administrators.

### 3.3 Results

Table 1 shows some demographic information of participants who age in between 23 and 53 with a mean value of 35. According to results, participants spend approximately more than 3 hours with their computers and/or internet daily. It is important to note that this number does not reflect the time spend for instructional purposes only.

Table 1: Demographic information of participants

	Mean	SD
Daily Computer Use (hours)	3.3	2.6
Daily Internet Use (hours)	3.0	2.6
Number of Technological Device Used	2.9	1.1
Age	35	8.5

The participants' leadership style could be considered as mixture of both transformational and transactional leadership style components. The results on the mean and standard deviation values of leadership style and its dimensions as shown in Table 2 indicates that participants perform both transformational leadership style ( $X=3.16$ ) and transactional leadership style ( $X=3.40$ ).

Table 2: Participants' scores on leadership style factors

	Mean	SD
<b>Transformational Leadership</b>	3.16	0.54
Charisma	3.40	0.51
Intellectual stimulation and individualized consideration	2.91	0.63
<b>Transactional Leadership</b>	3.40	0.47
Contingent reward	3.28	0.51
Management by exception	3.52	0.51

Note: Each item was rated on the 5 point scale from 1 (not at all) to 5 (always).

It is also noted that Charisma factor of Transformational Leadership style and Management by Exception factor of Transactional Leadership style have the highest mean values which are 3.40 and 3.52 respectively.

Table 3: Participants' scores on technology leadership competency dimensions

	Mean	SD
Visionary Leadership	2.37	0.57
Systematic Improvement	3.93	0.54
Digital Citizenship	2.90	0.49
Technology Leadership Competency	3.07	0.40

Note: Each item was rated on the 4 point scale from 1 (not at all) to 4 (always)

The mean value of technology leadership competency level as indicated in Table 3 shows that participants perceive themselves to be competent in technology leadership most of the time. According to results, the visionary leadership dimension has the lowest mean value of 2.37 and the systematic improvement dimension has the highest mean value of 3.93.

Table 4 indicates Pearson correlation coefficient values amongst leadership style, leadership style factors, level of technology leadership competency and its dimensions. The survey results show strong correlation ( $p < .01$ ) amongst transformational leadership style, transformational leadership style factors, transactional leadership style and transactional leadership style factors.

The level of technology leadership competency is strongly correlated with contingent reward factor of transactional leadership style. The survey results also shows that visionary leadership dimension of technology leadership competency is either not correlated or weakly correlated ( $-0.1 < r < +0.1$ ) with transformational and transactional leadership styles and with all their factors except contingent reward ( $r=0.16$ ). As a result it can be claimed that leadership style of a leader can not be predicted by visionary leadership competency level of a leader. Moreover the strong correlation ( $p < .01$ ) between the technology leadership competency level and all its dimensions is expected due to the high reliability value of the (TELÖY) scale.

Finally the level of technology leadership competency is correlated moderately with transformational leadership style ( $r=.33$ ) and its factors ( $r=.29$  &  $r=.33$ ) as well as transactional leadership style ( $r=.36$ ).

Table 4: Correlations Matrix between variables

	TF	CH	II	TS	CR	ME	TLC	VL	SI	DC
<b>Transformational Leadership (TF)</b>	1	.94**	.96**	.84**	.69**	.86**	.33*	-0.01	.52**	0.25
Charisma (CH)	.94**	1	.81**	.82**	.66**	.86**	.29*	-0.06	.58**	0.16
Intellectual stimulation and individualized consideration (II)	.96**	.81**	1	.78**	.64**	.79**	.33*	0.03	.43**	.30*
<b>Transactional Leadership (TS)</b>	.84**	.82**	.78**	1	.92**	.92**	.36*	0.05	.51**	0.26
Contingent reward (CR)	.69**	.66**	.64**	.92**	1	.70**	.41**	0.16	.47**	.31*
Management by exception (ME)	.86**	.86**	.79**	.92**	.70**	1	0.25	-0.05	.47**	0.17
<b>Technology Leadership Competency (TLC)</b>	.33*	.29*	.33*	.36*	.41**	0.25	1	.74**	.72**	.82**
Visionary Leadership (VL)	-0.01	-0.06	0.03	0.05	0.16	-0.05	.74**	1	0.18	.45**
Systematic Improvement (SI)	.52**	.58**	.43**	.51**	.47**	.47**	.71**	0.18	1	.45**
Digital Citizenship (DC)	0.25	0.16	.300*	0.26	.31*	0.17	.82**	.45**	.45**	1

\*\* Correlation is significant at the 0.01 level (2-tailed). \* Correlation is significant at the 0.05 level (2-tailed).

#### **4. Conclusion**

Researchers so far have aimed to investigate the leadership style correlated with level of computer use (Ashravi et al., 2009) or integration of ICT into teaching (Ng, 2008). Based on literature, there are number of studies investigating the level of technology or computer use of leaders however a small number of studies investigated the technology leadership competency (Hacıfazlıoğlu et al., 2011). In addition studies that supports the correlation between transformational leadership style and (perceived) level of computer use does not necessarily leads to an interpretation of transformational leaders' competency as technology leaders. For instance Ashravi et.al (2009) in his study suggests implementing transformational leadership components for Iranian school principals in order to transform schools through ICT after correlating perceived level of computer use and leadership style. However, a principal who use ICT frequently may not be competent to transform schools. Therefore it is important to note that this study aims to reveal if the leadership style can be an indicator of competent technology leaders. In addition, it would be misleading for leaders to implement leadership style characteristics as a method of good leadership practices similar to early studies on leadership styles which aimed to find the best way of leading (Ogbonna & Harris, 2000). As Bass and Avolio (1999) maintains, a successful leader displays both transformational and transactional leadership styles which is evidenced by positive correlation between two leadership styles.

The results of this study, as indicated in Table 4 shows that both transformational and transactional leadership styles moderately and similarly correlated with level of technology leadership competency. According to the results, technology leadership competency level is not a predictor of leadership style of an individual, since the moderate correlation between technology leadership competency level and both leadership style values are close to each other. Although Ng's study (2008) reveals strong correlation between transformational leadership and ICT integration into teaching which is an indicator of technology leadership competency, Dexter (2007) argues that ICT integration into teaching relies mostly on teachers as a result technology leadership distributed among people therefore technology leadership is a school characteristic rather than merely the principal's. In addition, according to the GLOBE study (House et al., 2004) desired leadership behavior may differ between different countries, consequently one leadership style may benefit followers differently depending on countries. Since countries (in Iran by Ashravi's et al. (2009), in Singapore by Ng (2008) and in Turkey) are belong to different culture clusters according to the GLOBE study (House et al., 2004) the effect of leadership style on technology leadership competency of an individual may differ due to context of the study. Therefore this study supports that leadership style of an individual is not directly correlated with technology leadership competency level.

#### **5. Limitations and Suggestions**

The sample of the study includes directors, deputy directors and administrators from different educational institutions which may not necessarily be part of learning process such as student dormitories. Hence two dimensions of technology leadership competency scale namely digital age learning culture and excellence in professional practice which are directly related to learning process, were excluded from the study. Therefore it is suggested to implement the study with the complete technology leadership competency scale by improved sampling techniques as well as with a larger sample size.



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