The difference among School Management Strategy, Principals Technology Leadership have on the School Effectiveness for Industrial and Vocational High School in Taiwan

*Hui-Min Lai, Yung-Fu Chang, Chang-Ho Yang and Der-Fa Chen,*

*National Changhua University of Education*

*E-MAIL:doei900716@cyivs.cy.edu.tw*

*Teacher, National Chia-Yi Industrial Vocational High School, Chia-Yi, Taiwan*

ABSTRACT

The purpose of the research is to investigate what difference Principals Technology Leadership, School Management Strategy have on the School Effectiveness for Industrial and Vocational High School Principals and director in Taiwan.

This research adopted questionnaire survey to collect data. The valid questionnaires remained 263.

According to the report, the findings were as follows:1.The sub-factor technology integration have made significant difference in education level.

2.The sub-factor administrative performance, a significant difference was noted for gender.

3.The sub-factors job satisfaction, organizational climate, and scale of overall school effectiveness, have made significant difference for years.

4.The sub-factors job satisfaction, and scale of overall school effectiveness, have made significant difference for education.

Finally, based on the findings of this study, further discussions and suggestions were made.

Keywords：Industrial and Vocational High School、Principals Technology Leadership、School Management Strategy、School Effectiveness.

**1.Introduction**

Science and technology leadership is the focus of our country's school leadership research in the new era.Flanagan and Jacobson(2003) study found that the implementation of Information and Communications Technologies(ICT) is an important part of school reform activities.Operating the school by strategy has also been found to help improve organizational performance and push the school towards excellence(Deeboonmee & Ariratana, 2014).Wu & Gao(2009) found that in the social atmosphere of declining birthrates and the society’s requirements for educational quality, only by improving the efficiency of running a school and creating a good school brand can it be sustainable.School effectiveness refers to technology teadership and school management strategy in the principal, all aspects can effectively achieve the predetermined goals.

**2.literature view:**

All walks of life are not evolving to cope with the new changes in the AI era, and school education also needs to face different battles, principals need to use appropriate leadership skills to lead the school.Shi & Shi(2020) indication in the rapidly changing environment, principals need to actively act as technological leaders to increase school effectiveness.In 2012 International Society for Technology in Education(ISTE) announce educational technology standards and performance indicators for administrators. Technology leadership refers to the process of leaders leading school members to learn technology, integrate technology, and use technology in the school environment. Principals need to further advance with technology in order to play the role of technology leader.

The school is facing huge shocks in politics, economy, technology, and climate in the international society, and is constantly impacting, need to change the business strategy in order to meet the continuous challenge.Hong(2018) study found that principals focused on a single aspect of school management and were more confined to administrative leadership. For school curriculum development, they seldom used strategies to lead the school from a comprehensive perspective.Principals should use leadership and management strategies and various effective ways to achieve school education goals and enhance school effectiveness(Deeboonmee & Ariratana, 2014).The main purpose of school management is to achieve school effectiveness. Through the effective use of technology in school management strategies, the school can achieve the school’s goals in all aspects.

Regardless of formal or informal organizations, there must be leaders in each organization leading.

Edmonds(1979)was the first proponent school effectiveness.Herrera(2010) which proposed the school effectiveness refers to the ability of school teachers and administrators to perform their duties, work hard to complete the educational goals and achieve the school's predetermined plan, so that the school can achieve harmonious and good results in both administrative and teaching performance.

School effectiveness means that a school has good performance in all aspects, including student academic achievement, principal’s leadership, business strategy, school atmosphere, etc.

**3.Methodology：**

This study examined what difference Principals Technology Leadership, School Management Strategy have on the School Effectiveness for Industrial and Vocational High School Principals and director in Taiwan. Research framework shown in Figure1.



Figure1 Research framework Chart

Participate：

Vocational High School Principals and director as to understand Principals Technology Leadership, School Management Strategy and School Effectiveness. The valid questionnaires remained 263.

**4. Results：**

(1)This section is examined the Different gender, age, education level. Have to overall Principals Technology Leadership and its sub-factors.

Table1 t-test analysis of the significant difference between female and male on principals technology leadership table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | gender | Number | average value | Standard deviation | t value |
| Technology integration | female | 87 | 4.08 | 0.66 | -0.67 |
| male | 176 | 4.14 | 0.62 |
| Co-lead | female | 87 | 3.93 | 0.69 | -0.87 |
| male | 176 | 4.01 | 0.74 |
| Productive forces | female | 87 | 4.07 | 0.86 | 0.36 |
| male | 176 | 4.03 | 0.88 |
| Overall Principals Technology Leadership | female | 87 | 3.93 | 0.69 | -0.47 |
| male | 176 | 4.01 | 0.74 |

\*P<.05

Table2 ANOVA analysis of the significant difference among31〜40, 41〜50 and 51 older than(with) on principals technology leadership table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | years | Number | average value | Standard deviation | F value | Scheffé |
| Technology integration | (1) | 35 | 3.85 | 0.63 | 3.89\* | (2)>(1)、(3)>(1) |
| (2) | 109 | 4.16 | 0.62 |
| (3) | 119 | 4.17 | 0.62 |
| Co-lead | (1) | 35 | 3.78 | 0.70 | 1.78 |  |
| (2) | 109 | 3.98 | 0.72 |
| (3) | 119 | 4.04 | 0.73 |
| Productive forces | (1) | 35 | 4.21 | 0.91 | 0.85 |  |
| (2) | 109 | 4.05 | 0.79 |
| (3) | 119 | 3.99 | 0.93 |
| Overall Principals Technology Leadership | (1) | 35 | 3.95 | 0.52 | 0.80 |  |
| (2) | 109 | 4.06 | 0.49 |
| (3) | 119 | 4.07 | 0.55 |

\*P<.05 (1)31〜40(2)41〜50(3)51Older than(with)

Table3 ANOVA analysis of the significant difference among university, master and phd on school principals technology leadership table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | education | Number | average value | Standard deviation | F value | Scheffé |
| Technology integration | (1) | 29 | 4.11 | 0.64 | .004 |  |
| (2) | 205 | 4.12 | 0.64 |
| (3) | 29 | 4.11 | 0.57 |
| Co-lead | (1) | 29 | 3.82 | 0.73 | 1.114 |  |
| (2) | 205 | 3.99 | 0.73 |
| (3) | 29 | 4.09 | 0.62 |
| Productive forces | (1) | 29 | 3.98 | 1.10 | 2.177 |  |
| (2) | 205 | 4.10 | 0.81 |
| (3) | 29 | 3.75 | 0.97 |
| Overall Principals Technology Leadership | (1) | 29 | 3.97 | 0.63 | .726 |  |
| (2) | 205 | 4.07 | 0.52 |
| (3) | 29 | 3.98 | 0.42 |

\*P<.05 (1)University(2)master(3)PhD

Table4 Difference analysis of the Principals Technology Leadership table-F/T value.

|  |  |  |  |
| --- | --- | --- | --- |
| dimensions /(Post-hoc analysis) | gender | years | education |
| technology integration | -0.67 | 3.89\* | 0.004 |
| (Post-hoc analysis) |  | (2)>(1)、(3)>(1) |  |
| Co-lead | -0.87 | 1.78 | 1.114 |
| productive forces | 0.36 | 0.85 | 2.177 |
| overall principals technology leadership | -0.47 | 0.8 | 0.726 |

\*P<.05

The overall principals technology leadership and its sub-factors, have no significant difference, except technology integration have made significant difference in education level. According to the Scheffe test, which is one of the post hoc tests, results 41-51 years and 51years older than(with), percept higher technology integration than 31〜40(F=3.89, p < 0.5).

(2)This section is examined the Different gender, age, education level. Have to overall school management strategy and its sub-factors.

Table5 t-test analysis of the significant difference between female and male on school management strategy table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | gender | Number | average value | Standard deviation | t value |
| Principal leadership | female | 87 | 4.43 | 0.49 | -1.79 |
| male | 176 | 4.55 | 0.48 |
| Course Teaching | female | 87 | 4.32 | 0.49 | -1.11 |
| male | 176 | 4.39 | 0.51 |
| Education Quality Control | female | 87 | 4.38 | 0.56 | -0.30 |
| male | 176 | 4.40 | 0.49 |
| Public relationship | female | 87 | 4.34 | 0.54 | -0.92 |
| male | 176 | 4.41 | 0.53 |
| School future vision | female | 87 | 4.35 | 0.50 | -0.98 |
| male | 176 | 4.42 | 0.50 |
| Overall School Management Strategy | female | 87 | 4.37 | 0.44 | -1.16 |
| male | 176 | 4.43 | 0.44 |

\*P<.05

Table6 ANOVA analysis of the significant difference among31〜40, 41〜50 and 51 older than(with) on school management strategy table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | years | Number | average value | Standard deviation | F value | Scheffé |
| Principal leadership | (1) | 35 | 4.47 | 0.44 | 0.15 |  |
| (2) | 109 | 4.51 | 0.49 |
| (3) | 119 | 4.52 | 0.49 |
| Course Teaching | (1) | 35 | 4.28 | 0.47 | 0.85 |  |
| (2) | 109 | 4.40 | 0.53 |
| (3) | 119 | 4.36 | 0.50 |
| Education Quality Control | (1) | 35 | 4.31 | 0.56 | 0.48 |  |
| (2) | 109 | 4.41 | 0.53 |
| (3) | 119 | 4.40 | 0.49 |
| Public relationship | (1) | 35 | 4.35 | 0.50 | 0.23 |  |
| (2) | 109 | 4.41 | 0.53 |
| (3) | 119 | 4.38 | 0.55 |
| School future vision | (1) | 35 | 4.29 | 0.52 | 1.01 |  |
| (2) | 109 | 4.42 | 0.49 |
| (3) | 119 | 4.40 | 0.50 |
| Overall School Management Strategy | (1) | 35 | 4.34 | 0.42 | 0.59 |  |
| (2) | 109 | 4.43 | 0.45 |
| (3) | 119 | 4.41 | 0.44 |

\*P<.05 (1)31〜40(2)41〜50(3)51 Older than(with)

Table7 ANOVA analysis of the significant difference among university, master and phd on school management strategy table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | education | Number | average value | Standard deviation | F value | Scheffé |
| Principal leadership | (1) | 29 | 4.37 | 0.46 | 1.38 |  |
| (2) | 205 | 4.53 | 0.49 |
| (3) | 29 | 4.53 | 0.46 |
| Course Teaching | (1) | 29 | 4.20 | 0.42 | 2.62 |  |
| (2) | 205 | 4.37 | 0.52 |
| (3) | 29 | 4.49 | 0.43 |
| Education Quality Control | (1) | 29 | 4.33 | 0.55 | 0.22 |  |
| (2) | 205 | 4.40 | 0.52 |
| (3) | 29 | 4.40 | 0.43 |
| Public relationship | (1) | 29 | 4.37 | 0.51 | 0.65 |  |
| (2) | 205 | 4.38 | 0.54 |
| (3) | 29 | 4.49 | 0.50 |
| School future vision | (1) | 29 | 4.26 | 0.48 | 1.35 |  |
| (2) | 205 | 4.40 | 0.51 |
| (3) | 29 | 4.47 | 0.48 |
| Overall School Management Strategy | (1) | 29 | 4.31 | 0.42 | 1.16 |  |
| (2) | 205 | 4.42 | 0.45 |
| (3) | 29 | 4.48 | 0.38 |

\*P<.05 (1)University(2)master(3)PhD

Table8 Difference analysis of the School Management Strategy table-F/T value.

|  |  |  |  |
| --- | --- | --- | --- |
| dimensions /(Post-hoc analysis) | gender | years | education |
| Principal leadership | -1.79 | 0.15 | 1.38 |
| Course Teaching | -1.11 | 0.85 | 2.62 |
| Education Quality Control | -0.3 | 0.48 | 0.22 |
| Public relationship | -0.92 | 0.23 | 0.65 |
| School future vision | -0.98 | 1.01 | 1.35 |
| Overall School Management Strategy | -1.16 | 0.59 | 1.16 |

\*P<.05

No significant was found between the sub-factors of the overall school management strategy scales.

(3)This section is examined the Different gender, age, education level. Have to overall School Effectiveness and its sub-factors.

Table9 t-test analysis of the significant difference between female and male on school effectiveness table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | gender | Number | average value | Standard deviation | t value |
| Administrative performance | female | 87 | 4.15 | 0.51 | -1.53\* |
| male | 176 | 4.26 | 0.62 |
| Job satisfaction | female | 87 | 4.03 | 0.60 | -3.30 |
| male | 176 | 4.28 | 0.58 |
| Organizational climate | female | 87 | 3.93 | 0.59 | -2.63 |
| male | 176 | 4.15 | 0.64 |
| Overall  School Effectiveness | female | 87 | 4.15 | 0.51 | -0.29 |
| male | 176 | 4.26 | 0.62 |

\*P<.05

Table10 ANOVA analysis of the significant difference among31〜40, 41〜50 and 51 older than(with) on school effectiveness table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | years | Number | average value | Standard deviation | F value | Scheffé |
| Administrative performance | (1) | 35 | 4.07 | 0.52 | 1.44 |  |
| (2) | 109 | 4.26 | 0.60 |
| (3) | 119 | 4.23 | 0.59 |
| Job satisfaction | (1) | 35 | 3.93 | 0.56 | 4.34\* | (3)>(1) |
| (2) | 109 | 4.20 | 0.59 |
| (3) | 119 | 4.27 | 0.60 |
| Organizational climate | (1) | 35 | 3.80 | 0.55 | 4.09\* | (3)>(1) |
| (2) | 109 | 4.09 | 0.65 |
| (3) | 119 | 4.14 | 0.62 |
| Overall  School Effectiveness | (1) | 35 | 3.93 | 0.47 | 3.99\* | (2)>(1)、(3)>(1) |
| (2) | 109 | 4.18 | 0.53 |
| (3) | 119 | 4.21 | 0.54 |

\*P<.05 (1)31〜40(2)41〜50(3)51 older than(with)

Table11 ANOVA analysis of the significant difference among university, master and phd on school effectiveness table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | education | Number | average value | Standard deviation | F value | Scheffé |
| Administrative performance | (1) | 29 | 4.02 | 0.52 | 2.14 |  |
| (2) | 205 | 4.23 | 0.59 |
| (3) | 29 | 4.32 | 0.63 |
| Job satisfaction | (1) | 29 | 3.93 | 0.60 | 4.69\* | (3)>(1) |
| (2) | 205 | 4.21 | 0.60 |
| (3) | 29 | 4.40 | 0.51 |
| Organizational climate | (1) | 29 | 3.90 | 0.55 | 2.50 |  |
| (2) | 205 | 4.07 | 0.65 |
| (3) | 29 | 4.26 | 0.52 |
| Overall  School Effectiveness | (1) | 29 | 3.95 | 0.45 | 3.87\* | (3)>(1) |
| (2) | 205 | 4.17 | 0.54 |
| (3) | 29 | 4.33 | 0.49 |

\*P<.05 (1)University(2)master(3)PhD

Table12 Difference analysis of the School Effectiveness table-F/T value.

|  |  |  |  |
| --- | --- | --- | --- |
| dimensions /(Post-hoc analysis) | gender | years | education |
| administrative performance | -1.53\* | 1.44 | 2.14 |
| (Post-hoc analysis) |  |  |  |
| job satisfaction | -3.3 | 4.34\* | 4.69\* |
| (Post-hoc analysis) |  | (3)>(1) | (3)>(1) |
| organizational climate | -2.63 | 4.09\* | 2.5 |
| (Post-hoc analysis) |  | (3)>(1) |  |
| overall  school effectiveness | -0.29 | 3.99\* | 3.87\* |
| (Post-hoc analysis) |  | (2)>(1)、(3)>(1) | (3)>(1) |

\*P<.05

For administrative performance, a significant difference was noted for gender (t=-1.53, p<0.5). Results male percept higher administrative performance than administrative performance.

For job satisfaction, a significant difference was noted for years and education(F=4.34, p < 0.5 and F=4.69, p < 0.5, respectively). According to the Scheffe test, which is one of the post hoc tests, results 51 years older than(with), percept higher job satisfaction than 31〜40. And PhD percept higher job satisfaction than University.

For organizational climate, a significant difference was noted for years(F=4.09, p<0.5).According to the Scheffe test, which is one of the post hoc tests, results 41-51 years and 51years older than(with), percept higher organizational climate than 31〜40(F=3.89, p < 0.5).

For overall school effectiveness, a significant difference was noted for years and education(F=3.99, p < 0.5 and F=3.87, p < 0.5, respectively).According to the Scheffe test, which is one of the post hoc tests, results 51years older than(with), percept higher overall school effectiveness than 31〜40. And PhD percept higher overall school effectiveness than University.

**5.Conclusion:**

The overall principals technology leadership and its sub-factors, have no significant difference, except technology integration have made significant difference in education level.For administrative performance, a significant difference was noted for gender.The sub-factors job satisfaction, organizational climate, and scale of overall school effectiveness, have made significant difference for years. The sub-factors job satisfaction, and scale of overall school effectiveness, have made significant difference for education.

Chang (2010) found that principal will get back the funds to be executed by the director who has experience in executing the plan, 31-40 years old part-time teacher with less experience, less aware of the resource allocation made by the principal to implement the plan.One of the key points of school effectiveness is sharing each other’s experiencess(Huang, Huang, & Shen, 2019). 31-40 years old has less experience as a first-level supervisor than older people, and less experience can be shared. This is a factor that causes differences due to age variables.The school can achieve both personal and organizational goals. Personally, a doctorate degree is the highest academic goal. As far as the school is concerned, the colleagues of the doctorate degree have rich experience in implementing various projects and are more comfortable with the implementation of the projects undertaken by the school(Xu, & Lin, 2020), this is a factor that causes differences due to changes in education level.

This study contributes to theory and practice in two ways. First,it enhances the understanding of Vocational High School Principals and director Principals Technology Leadership, School Management Strategy and School Effectiveness. Second, the establish relations among Principals Technology Leadership, School Management Strategy and School Effectiveness with not arbitrarily chosen questionnaire.

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