Technological Leadership of Administrators of Public Technological Universities in Guangdong Province, People's Republic of China

Chen JinPing[1], Sripen Poldech[2], Kovit Vajarintarangoon[3]

[1]Education Program in Educational Administration, Faculty of Education, Buriram Rajabhat University, Buriram, Thailand

[2,3]Faculty of Education, Buriram Rajabhat University, Buriram, Thailand

Corresponding Author: Email: 640426021021@bru.ac.th[1], Sripen.pd@bru.ac.th[2], kovit.va@bru.ac.th[3]

Abstract

This research aimed to study and compare the technological leadership of administrators of public technological universities in Guangdong province, People's Republic of China. The sample was 677 university administrators and lecturers obtained by using the table of Krejcie and Morgan, and proportional random sampling. The instrument used to collect the data was a questionnaire which consisted of check list and rating scale with the reliability of 0.936. Statistics used to analyze the data included percentage, mean, and standard deviation. The hypothesis was tested by using independent sample t-test, and one-way ANOVA or F-test. If any differences were found, pairwise comparisons using Scheffe's method was utilized. The results of the research revealed that 1) technological leadership of the administrators of public technological universities, overall, was a high level. When considering each aspect, it was found that every aspect was also at a high level; and 2) the comparisons of technological leadership of administrators of public technological universities classified by positions and educational background were different in overall and each aspect at statistically significant level of .05.

1. Introduction

According to the rapid changes of technology in the 21st century, human development through education is, therefore, important and necessary in public administration in terms of educational technology. In this regard, the state should promote scientific research and development, and various technologies and arts to create knowledge, growth, and innovation for the strength of society and to enhance the abilities of people in the nation (Constitution of the Kingdom of Thailand, 2017).

The process of higher education development in the People's Republic of China, according to the announcement of the Ministry of Education 2021 on standards for creating digital educational institutions, is determined to actively promote the in-depth integration of education and teaching pedagogy from the survey and then make the rigorous improvements of educational technology including the continuous creation of information technology for higher education to be up to date. This requires the administrators to be equipped with technological leadership which is the ability of the administrators to influence,

persuade and promote the integration of technology in the university management as well as learning management under the cooperation of all parties involved to create compatibility or harmony between technology and policy. Apart from that, equal opportunities for accessing technology for all students and personnel must be created. Moreover, the administrators should be a role model in enforcing social, legal and ethical practices to hold everyone accountable in their use of technology as well as safety, and privacy in the use of technology. In addition, the ability of the administrators to develop new management and operational evaluation systems using information technology to collect, analyze, interpret the results, and evaluate the quality of information technology used in educational institutions is essential in order to ensure that the goals of administration, and teaching and learning management are successfully achieved (Somsak Jeewattana. 2012: 140, Sunantha Somjai. 2018: 357 and Schrum & Levin, 2009).

Guangdong province is one of the provinces with rapid economic growth. It is also one of the important driving mechanisms of the economic growth of the People's Republic of China. It has an advantageous geographic location and convenient transportation conditions. There are a total of 29 well-known and popular public technological universities in 2023, providing educational services in various fields of study, with an emphasis on innovation and entrepreneurship which plays an important role in social and economic development in Guangdong province. However, there have been problems with technological leadership of administrators of public technological universities in terms of the lack of knowledge and understanding in planning and creating information technology. Although some colleges and universities are gradually strengthening awareness in creating information technology, understanding and planning for information technology are still deficient. Likewise, the management of facilities for using technology is inadequate and unbalanced in refining distinct abilities of creating information technology to become professional personnel (Jiang Nan, 2023).

From the background and importance of the aforementioned problems, the researchers are, therefore, interested in examining the technological leadership of administrators of public technological universities in Guangdong province, People's Republic of China in order to be applied as the information for self-development in technological leadership for the university administrators of technology. Moreover, the relevant agencies can use it as a guideline in formulating policies to develop the technological leadership of university administrators, lecturers, and educational personnel to be equipped with a higher standard of quality.

2. Research Objectives

2.1 To study the technological leadership of administrators of public technology universities in Guangdong province, People's Republic of China according to the opinions of university administrators and lecturers

2.2 To compare the technological leadership of administrators of public technological universities in Guangdong province, People's Republic of China according to the opinions of university administrators and lecturers, classified by positions and educational background

3. Research Question

What is the level of technological leadership of administrators of public technological universities in Guangdong province, People's Republic of China?

4. Literature Reviews and Research Frameworks

The literature reviews and research conceptual frameworks of the present study on technological leadership of administrators of public technological universities in Guangdong province, People's Republic of China were as follows:

4.1 Literature reviews on the concepts of technological leadership theory were studied from Zhang Hong (2017), LiuMeiLing (2020), LingBo (2023), ZhouFuYu (2023), Kobsak Munmai (2011) and Jinnawat Pakotang (2018)

4.2 Related research was from DongTongqiang (2020), ZhangHong (2022), ZouYan (2020), XiongHuaXia (2021), ChuJiaoJiao (2022), Chanyaphak Yaidee (2018), and Rasamee Saengchum (2019)

4.3 Research Conceptual Framework: The scope of the content on technological leadership of administrators of public technological universities in Guangdong province, People's Republic of China (Zhang Hong, 2022) is illustrated in Figure 1:
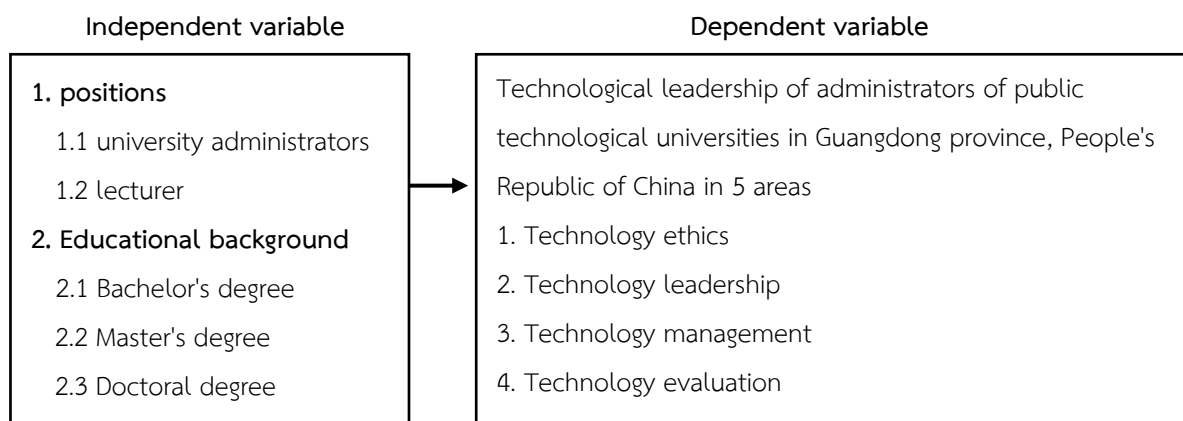
Independent variable	Dependent variable

1. positions
   1.1 university administrators
   1.2 lecturer
2. Educational background
   2.1 Bachelor's degree
   2.2 Master's degree
   2.3 Doctoral degree
	Technological leadership of administrators of public technological universities in Guangdong province, People's Republic of China in 5 areas
	1. Technology ethics
	2. Technology leadership
	3. Technology management
	4. Technology evaluation

Figure 1: Research conceptual framework

5. Methodology

The research methodology was as follows:

5.1 Population and sample included the university administrators and lecturers from 29 institutions of public technological universities in Guangdong province, People's Republic of China in

academic year 2023. The sample size was determined according to Krejcie and Morgan's table (Krejcie & Morgan. 1970: 608-610; cited in Prasit Suwanrak. 2012: 148-149). The sample was 677 people, divided into 297 university administrators, and 380 lecturers, and then they were selected by using proportional random sampling.

5.2 Variables used in the research included:

5.2.1 Independent variables were 1) positions which were divided into university administrators and lecturers; and 2) educational qualifications which were divided into bachelor's degree, master's degree, and doctoral degree.

5.2.2 The dependent variable was technological leadership of administrators of public technological universities in Guangdong province, People's Republic of China which consisted of five areas: 1) technological ethics, 2) technological leadership, 3) technology management, 4) technology evaluation, and 5) creating a technological culture.

5.3 The instrument was a 5-level rating scale questionnaire. The content validity of the questionnaire was determined using Index of Item Objective Congruence (IOC) which had a value between 0.67 - 1.00, and the reliability level of the questionnaire was at 0.936.

5.4 The statistics used for the data analysis included percentage, mean, standard deviation, independent sample t-test, and one-way ANOVA or F – test.

5.5 The data collection was carried out by sending the questionnaire via online channel to the sample group. It took a period of two weeks to collect the data. Once a total of 677 questionnaires had been received, the data were converted into numbers for further statistical analysis.

6. Results

6.1 Technological leadership of administrators of public technological universities in Guangdong province, People's Republic of China, overall, was at a high level ($\overline{X}$ = 3.99). When considering each aspect, it can be summarized in descending order of averages as follows:

6.1.1 Technology management, overall, was at a high level ($\overline{X}$ = 4.01). When considering each item, it was found that the item with the highest average was that the administrators promote the integration of computer technology and communication technology for effective communication with other departments in the university ($\overline{X}$ = 4.03). However, the item with the lowest average was that the administrators collaborate with the stakeholders to drive the university's technological transformation ($\overline{X}$ = 3.96).

6.1.2 There were two aspects, i.e., technology ethics, and technology evaluation that received the equivalent average. The details were as follows:

6.1.2.1 For technology ethics, the overall average was at a high level ($\overline{X}$ = 4.00). When considering each item, it was found that the item with the highest average was that administrators seriously set rules and regulations for the university's technology operations ($\overline{X}$ = 4.05) whereas the item with the

lowest average was that the administrators identify and respond to the security needs of personal and university information ($\overline{X}$ = 3.94).

6.1.2.2 Regarding technology evaluation, the overall average was also at a high level ($\overline{X}$ = 4.00). When considering each item, it was found that the item with the highest average was that the administrators continuously check the quality of technology operations to meet the specified standards ($\overline{X}$ = 4.06) while the item with the lowest average was that the administrators continuously check the networking technology system to connect within and between the departments ($\overline{X}$ = 3.95).

6.1.3 As for technology leadership, the overall average was at a high level ($\overline{X}$ = 3.99). When considering each item, it was found that the item with the highest average was that the administrators provide adequate and up-to-date computer equipment, computer program, and network system to facilitate working process and teaching ($\overline{X}$ = 4.03). However, the item with the lowest average was that the administrators can create and maintain a sustainable learning community network ($\overline{X}$ = 3.93).

6.1.4 For creating a technological culture, the overall average was at a high level ($\overline{X}$ = 3.97). When considering each item, it was found that the item with the highest average was that the administrators design computer programs to be used within their own departments in order to maximize the benefit, and the administrators systematically evaluate lecturers' technology skills ($\overline{X}$ =3.99) whereas the item with the lowest average was that the administrators can use technology to drive the university to be a learning organization ($\overline{X}$ = 3.94).

6.2 The comparison of technological leadership of administrators of public technological universities classified by positions, and educational background were as follows:

6.2.1 According to the comparison of technological leadership in terms of positions, significant different was found in overall and each aspect at statistical level of .05 in which the lecturers have a higher average than the university administrators.

6.2.2 In terms of the comparison of technological leadership by educational background, significant different was also found in overall and each aspect at statistical level of .05.

It can be seen that the differences were found, so pairwise comparisons using Scheffe's method were conducted. It was found that, in every aspect, the opinions of the university administrators and the lecturers with bachelor's degrees and those with doctoral degrees were significantly different at the statistical level of .05. Moreover, there was also a significant difference at the statistical level of .05 for the opinions of the university administrators and the lecturers with master's degrees and those with doctoral degrees whereas no difference was found in other pairs.

7. Discussion

In this section, the findings of this study were discussed based on the important issues as follows:

7.1 Technological leadership of administrators of public technological universities in Guangdong province, People's Republic of China, overall, was at a high level. This might be because the public universities of technology in Guangdong province have operated under the state's macro-policy to improve educational content by using technology in management and teaching (Jiang Nan, 2023). For example, the universities have to deploy and upgrade the network by the end of 2022. Moreover, most of the public technological university in Guangdong province are quite advanced in data analysis and processing, so platforms such as centralized identity portals and data centers have been deployed. In addition, there is a single standard for data in which one database and one code are used for internet access by creating a data center, "One account, One data, One group of websites" etc. This is consistent with the research of Chanyaphak Yaidee (2018) on the study of guidelines for developing technology leadership of educational institution administrators under Nakhon Ratchasima Provincial Administrative Organization in which the results revealed that technology leadership of educational institution administrators, in overall and each aspect, was at a high level.

When considering each aspect, it was found that:

7.1.1 Technology leadership in technology management has the highest average. This is because technology management is the role and duty of university administrators which must be carried out in accordance with the guidelines announced on standards for creating digital educational institutions that is determined to actively promote the in-depth integration of education and teaching pedagogy from the survey and then make the rigorous improvements of educational technology including the continuous creation of information technology for higher education to be up to date (Ministry of Education, 2021). This is consistent with the research of Rasamee Saengchum (2019) on technological leadership of school administrators according to the perception of teachers in the school under Prachuap Khiri Khan Primary Educational Service Area Office 2 in which the research results found that technology management and operations has the highest average.

7.1.2 Technological leadership in creating a technological culture has the lowest average. This might be due to the imbalances in the geographic and economic conditions of the region in defining the scope of information technology creation. At present, many universities of technology have their own information technology creation processes and there is also a model for using educational resources and providing services based on information technology that has been created whether by the university itself or supported by society. The universities are aware of the fundamentals of data development with the influence of geography and economics. As a result, there is an intermittent and unequal development of information technology. For example, some universities have multimedia classrooms with appropriate facilities, but some are lack of those suitable technology which indicates the insufficient and unbalanced in development. This creates an obstacle and problem in creating an

environment where the use of technology is widespread and typical for university administrators. This is consistent with the idea proposed by Sukanya Chaemchoi (2017: 120) who mentioned that the role of school administrators in creating a technological culture is to create dynamics in the normal use of technology until it becomes a digital learning culture in the organization by organizing and promoting all learners to learn in the digital world thoroughly.

       7.2 The comparison of technological leadership classified by positions and educational background were discussed as follows:

          7.2.1 The comparison of technological leadership classified by positions, in overall and each aspect, was different in which the lecturers have higher opinions than the university administrators. This is because the university administrators are the ones with administrative authority in accordance with laws and policies and put them into practice with the participation of the team. However, the lecturers are actual practitioners, so they understand the management and technological leadership of university administrators well. This is consistent with the concept of Jinnawat Pakotang (2018) who states that the role of educational institution administrators in technological leadership consists of 1) communicate with stakeholders about the district or school's technology planning process and implementation efforts, 2) promote the participation of those involved in the technology planning process of the educational area or school, 3) analyze the consistency of the technology plan of the educational area or school with other plans, including the district's strategic plan, school development plans, or other teaching plans, 4) support the use of research-based technology in school development plans; and 5) participate in activities to search for best practice in the use of technology, such as reviewing literature, and participating in seminars or meetings in the important organization.

          7.2.2 The comparison of technological leadership classified by educational background Overall each aspect is significantly different at the .05 level because university administrators and professors with higher educational degrees have attitudes, principles, concepts, and in-depth knowledge. and have more ability Especially in technology from the development of teaching and learning according to the curriculum at a higher level, emphasis will be placed on searching databases both in and abroad widely Makes people aware of the leader's ability to use information technology as a medium that helps influence and influence followers and stakeholders in implementing organizational change and achieving common goals. According to Zhang Hong's leadership concept (ZhangHong, 2017)

8. Conclusions

       The findings revealed that 1) technological leadership of the administrators of public technological universities, overall, was at a high level. When considering each aspect, it was found that every aspect was also at a high level; and 2) the comparisons of the technological leadership of administrators of public technological universities classified by positions and educational background, in overall and each aspect, were significantly different at the .05 level.

9. Acknowledgements

This dissertation was accomplished with the support of many people. The researcher would like to thank Dr. Sripen Poldech, major advisor, Dr. Kowit Vajarintarangoon, co-advisor and Assistant Professor Dr. Kraphan Sringan, thesis examination committee member. Thank you for giving advice and suggestions with care and correcting the shortcomings. This makes this thesis complete and correct. I would also like to thank Luo Hua, Director of Educational Administration Office of Education South China Agricultural University, Luo Qing Xin, Director of the Office of Teaching and Research Office of Education South China Agricultural University, and Zhang Xin Xin, senior translator at the Beijing Silk Road Cultural Exchange Center and those involved that helps to carry out the research until it is successfully accomplished.

10. References

Chanyaphak Yaidee. (2018). "Study of guidelines for developing technology leadership of educational institution administrators Under the Nakhon Ratchasima Provincial Administrative Organization." **Doctoral Journal Social science, 8(1)**, January - April; 150 - 164.

Constitution of the Kingdom of Thailand. (2017, 6 April). **Royal Gazette.** Volume 134, Chapter 40 A. 1 - 90.

Dong Tong Qaing. (2020). **Research on the Informatization Leadership Model of Principals of Higher Vocational Colleges.** Tianjin: Tianjin University College of Education.

Jiang Nan. (2023). **Analysis and Countermeasures of the Current Situation and Countermeasures of Informatization Construction of Higher Vocational Colleges in Guangdong Province.** Guangdong: Guangdong Open University.

Jinnawat Pakothang. (2018). **Leadership in the digital age for professional school administrators.** Ubon Ratchathani: Siritham Offset.

Kobsak Munmai. (2011). **The relationship between transformational leadership of school administrators and the teaching efficiency of teachers under the Pathum Thani Primary Educational Service Area Office Area 1.** M.A. Thesis (Educational Administration Technology) Nonthaburi: Graduate School Rajamangala University of Technology Thanyaburi.

LingBo. (2023). **Research on Strategies to Improve Principal's Leadership.** Hebei: Dingzhou Middle School.

LiuMeiLing. (2020). **The Theoretical Connotation and Improvement Path of the Principal's Leadership of the "Double Higher Program" Higher Vocational Colleges**. Guangxi: Nanning Normal University. College of Educational Sciences.

Prasit Suwanrak. (2012). **Research methods in behavioral and social sciences. 10th printing.** Buriram: Educational Testing and Research Group, Faculty of Education, Buriram Rajabhat University.

QuJiaoJiao. (2022). **Digital Empowerment: The Era Direction and Improving Strategy of Principal's Informatization Leadership.** Jilin : Northeast Normal University.

Rasamee Saengchum. (2019). **Technological leadership of school administrators according to teachers' perceptions In educational institutions under the Prachuap Khiri Khan Primary Educational Service Area Office Area 2.** M.A. Thesis (Educational Administration). Nonthaburi: Graduate School, University Sukhothai Thammathirat Open University.

Schrum, L. & Levin, B.B. (2009). **Leading 21th Century Schools: Harnessing Technology for Engagement and Achievement.** California: SAGE Publications. Publications.

Somsak Jeewattana. (2012, October - December). "Development of information technology leadership indicators.and communication of educational personnel in basic educational institutions." **Journal of Education Vol. Graduate Research Khon Kaen University. 6(4)**; 133 - 143.

Sukanya Chaemchoi. (2017). **Educational institution administration in the digital age.** 2nd printing. Bangkok: Publisher. Chulalongkorn University.

Sunantha Somjai. (2018, January - April). "School management with technological leadership." **Dusit Thani College Journal, 12(1)**; 350 - 363.

Zhang Hong. (2022). **Research on the Informatization Leadership Mechanism of University Leaders. Beijing: National Academy of Educational Administration.** Department of Social Sciences Teaching and Research.

Zhou Fu Yu. (2023). **Research on the Development of Leadership of Contemporary Primary and Secondary School Principals.** Shaanxi: Department of Education, Shaanxi Normal University.

Zou Yan. (2020). **Improving Principals' Informatization Leadership and Leading the Future Development of Schools.** Shaanxi: Education and Training College of Shaanxi Preschool Teachers College.

Xiong Hua Xia. (2021). **Principal's Informatization Leadership: Basic Elements and Development Path-- An Empirical Analysis Based on NVIVO11.0 Interview Data.** Beijing: Faculty of Education, Beijing Normal University.