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# THE RELATIONSHIP BETWEEN VIRTUAL INSTRUCTIONAL LEADERSHIP, COMMUNICATION PATTERNS, AND TEACHING COMPETENCY IN CHONGQING'S URBAN PRIMARY SCHOOLS

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Universiti Utara Malaysia

**DOCTOR OF PHILOSOPHY**
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# THE RELATIONSHIP BETWEEN VIRTUAL INSTRUCTIONAL LEADERSHIP, COMMUNICATION PATTERNS, AND TEACHING COMPETENCY IN CHONGQING'S URBAN PRIMARY SCHOOLS

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**A thesis submitted to the Awang Had Salleh Graduate School of Arts and Sciences in fulfillment of the requirements for the Doctor of Philosophy Universiti Utara Malaysia**

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# Abstrak

Kepimpinan pengajaran pengetua memainkan peranan utama dalam meningkatkan kompetensi pengajaran guru (TC). Walau bagaimanapun, kajian menunjukkan bahawa peningkatan beban kerja pentadbiran menghalang keupayaan pengetua untuk memenuhi tanggungjawab kepimpinan instruksional, terutamanya di China. Namun, kepesatan teknologi telah membantu pengetua meningkatkan praktin kempipinan pengajaran. Justeru, kajian ini bertujuan untuk menganalisis hubungan antara Kepimpinan Instruksional Maya (VIL), dan TC serta peranan mediator Corak Komunikasi (CP) dalam hubungan tersebut. Selain itu kajian ini bertujuan untuk membangunkan model struktur Kepimpinan VIL, CP dan TC. Kajian kuantitatif secara tinjauan keratan rentas ini melibatkan 413 guru sekolah rendah yang dipilih secara rawak di Chongqing, China. Data dikumpul menggunakan instrumen soal selidik yang dimodifikasi daripada *Principal Instructional Management Rating Scale (PIMRS), Communication Satisfaction Questionnaire,* dan *Teacher Competency*. Data yang dikutip dianalisis menggunakan perisian IBM SPSS dan AMOS. Dapatan kajian menunjukkan VIL mempunyai hubungan yang signifikan terhadap CP, seterusnya terhadap TC. Selain itu, CP adalah berperanan sebgai mediator dalam hubungan antara VIL dan TC. Kajian ini juga berjaya membangunkan model yang mengintegrasikan ketiga-tiga pembolehubah ini. Dapatan kajian ini dijangka membawa implikasi yang bersar terhadap perkembangan pendidikan di China. walaubagaimana pun penyelidk akan datang adalah disyorkan untuk meluaskan lagi kajian ke wilayah lain di China dan jenis sekolah yang berbeza untuk mendapatkan hasilkajian yang tekal dan boleh digenerlisasikan ke seluruh negara China yang merentas pelbagai konteks dalam pendidikan.

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**Kata Kunci:** Kepimpinan Instruksional Maya, Kompetensi Pengajaran Guru, Pola Komunikasi, Model Persamaan Struktur, Kepimpinan Sekolah

# Abstract

Principals' instructional leadership plays a key role in improving teachers' teaching competence (TC). However, studies have shown that increasing administrative workloads hinder principals' ability to fulfill instructional leadership responsibilities, especially in China. However, the rapid development of technology has helped principals improve their instructional leadership practices. Therefore, this study aims to analyze the relationship between Virtual Instructional Leadership (VIL), and TC and the mediating role of Communication Patterns (CP) in the relationship. In addition, this study aims to develop a structural model of VIL, CP, and TC Leadership. This quantitative cross-sectional survey study involved 413 randomly selected primary school teachers in Chongqing, China. Data were collected using a questionnaire instrument modified from the Principal Instructional Management Rating Scale (PIMRS), Communication Satisfaction Questionnaire, and Teacher Competency. The collected data were analyzed using IBM SPSS and AMOS software. The study findings show that VIL has a significant relationship with CP, and then with TC. In addition, CP plays a role as a mediator in the relationship between VIL and TC. This study also successfully developed a model that integrates these three variables. The findings of this study are expected to have significant implications for the development of education in China. However, future researchers are recommended to expand the study to other regions in China and different types of schools to obtain consistent and generalizable results across China across various educational contexts.


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**Keywords:** Virtual instructional leadership, Teachers' teaching competency, Communication patterns, Structural Equation Model, School leadership.

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persevered. This journey has shown me that I am stronger and more resilient than I ever imagined. This realization will continue to inspire me as I navigate the challenges of life ahead.

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# CHAPTER ONE

# INTRODUCTION

## 1.1 Introduction

Communication is fundamental in every organization, acting as a pivotal social agent and a vital conduit for knowledge sharing (Van Ruler, 2020; Petryshyna & Boyko, 2021; Aririguzoh, 2022). Researchers have consistently highlighted that effective leaders are synonymous with effective communicators, emphasizing the indispensable role of organizational leaders in engaging consistently with subordinates (Barrett, 2006; Miller, 2006; Wang, 2019; Yang, 2007; Muhammad et al., 2022; Petryshyna & Boyko, 2021; Li et al., 2023). This engagement is crucial for effectively disseminating information, messages, and directions and maintaining the organizational workflow.

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In the specific context of school administration, the impact of effective communication is even more noticeable (Shin, 2016; Aryanti & Suhardan, 2020; Ekanem et al., 2020). It is a cornerstone for enhancing school effectiveness, elevating job satisfaction, and optimizing teachers' teaching competency (Zhao, 2016; Yao et al., 2018; Muhammad et al., 2022). Given these stakes, principals must prioritize consistent and skilled communication, focusing particularly on interactions with teachers and students. Such interactions not only contribute to a positive school culture but also support the professional development of teachers and the academic advancement of students (Lambersky, 2016; Ekanem et al., 2020; Petryshyna & Boyko, 2021).

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Universiti Utara Malaysia

## Appendix A

## The Invitation for Investigate the Validity of Questionnaire Letter

i. Prof Madya Dr. Mohd Yusri Ibrahim

Universiti Utara Malaysia

PUSAT PENGAJIAN PENDIDIKAN
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Tel : 604-9283381
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No. Ruj. : UUM/CAS/SOE /P74-1
Tarikh : 10 Januari 2024

Prof. Madya Dr. Mohd Yusri Ibrahim
Fakulti Perniagaan Ekonomi dan Pembangunan Sosial
Universiti Malaysia Terengganu
21030 Kuala Nerus Terengganu

YBhg.Prof./Prof.Madya/Dr./Tn./Pn.,

**APPOINTMENT AS AN EXPERT PANEL FOR EVALUATING RESEARCH INSTRUMENT**

Respectfully,the matter above is hereby referred to.

2. It is informed that the student details below is a Doctor of Philosophy (Educational Management) candidate at Universiti Utara Malaysia (UUUM):

Name :**Zhong Ming**
Matric No :**906113**
Faculty : **School of Education**
Research Title :**The Relationship Model Of Virtual Instructional Leadership, Patterns Of Communication And Teaching Competence Of Primary School Teachers In Chong Qing,China**

3. Therefore,I would like to request the expertise of Prof./Assoc.Prof./Dr./Mr./Ms.in assisting his research to make it more significant and relevant.Enclosed herewith are relevant documents for your further action and attention.Any inquiries or difficulties can be addressed to the researcher at **+86132 24000354** or via email at **376889458@qq.com**.

4. The cooperation and willingness of Prof./Assoc.Prof./Dr./Mr./Ms.regarding this matter are highly appreciated and preceded by a heartfelt thank you.

Thank you.

**"MALAYSIA MADANI"**
**"KEDAH SEJAHTERA-NIKMAT UNTUK SEMUA"**
**"ILMU BUDI BAKTI"**

**(QR.MAT RAHIMI YUSOF)**
Pfisat Pengajian Pendidikan
Universiti Utara Malaysia
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Universiti Utara Malaysia

ii. Pn. Aziah Samichan

**PUSAT PENGAJIAN PENDIDIKAN**
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No Ruj. : UUM/CAS/ SOE /P74-1
Tarikh : 10 Januari 2024

YBrs. Pn. Aziah Samichan
Institut Aminuddin Baki
Jln Institut Aminuddin Baki, Sri Layang,
69000 Genting Highlands,
Pahang

YBhg.Prof./Prof.Madya/Dr./Tn./Pn.,

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|---|---|
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Thank you.

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**"BERKHIDMAT UNTUK NEGARA"**
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**"ILMU BUDI BAKTI"**

**(DR. MAT RAHIMI YUSOF)**
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iii. Dr. Dayang Rafidah Syariff M. Fuad

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Tarikh : 10 Januari 2024

YBrs.Dr. Dayang Rafidah Syariff M. Fuad
Faculty Of Management And Economics
Universiti Pendidikan Sultan Idris
35900 Tanjung Malim
Perak

YBhg Prof./Prof.Madya/Dr./Tn./Pn.,

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**(DR. MAT RAHIMI YUSOF)**
Pusat Pengajian Pendidikan
Universiti Utara Malaysia
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Universiti Pengurusan Terkemuka
*The Eminent Management University*

# Appendix B

## The Invitation for Translation of Questionnaire Letter

i. Professor Li Hua

PUSAT PENGAJIAN PENDIDIKAN
*SCHOOL OF EDUCATION*
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06010 UUM SINTOK
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No Ruj.: UUM/CAS/SOE /P74-1
Tarikh 10 Januari 2024

Professor Li Hua
Director of the Engineering Science and Education Strategic
Research Center of Chongqing University
Chongqing, China

YBhg.Prof./Prof.Madya/Dr./Tn./Pn.,

**APPOINTMENT AS AN EXPERT PANEL FOR EVALUATING RESEARCH INSTRUMENT**

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4. The cooperation and willingness of Prof./Assoc.Prof./Dr./Mr./Ms.regarding this matter are highly appreciated and preceded by a heartfelt thank you.

Thank you.

**"MALAYSIA MADANI"**
**"KEDAH SEJAHTERA-NIKMAT UNTUK SEMUA"**
**"ILMU BUDI BAKTI"**

**(QR.MAT RAHIMI YUSOF)**
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Universiti Pengurusan Terkemuka

*The Eminent Management University*

ii. Professor Zhao Yunying

PUSAT PENGAJIAN PENDIDIKAN
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Tarikh 10 Januari 2024

Professor Zhao Yunying
Chongqing Academy of Educational Sciences
Chongqing, China

YBhg.Prof./Prof.Madya/Dr./Tn./Pn.,

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**(QR.MAT RAHIMI YUSOF)**
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iii. Professor Zhou Zhongzhi

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Tarikh 10 Januari 2024

Professor Zhou Zhongzhi
Chongqing Academy of Educational Sciences
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YBhg.Prof./Prof.Madya/Dr./Tn./Pn.,

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Research Title :The Relationship Model Of Virtual Instructional Leadership, Patterns Of Communication And Teaching Competence Of Primary School Teachers In Chong Qing,China

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**(QR.MAT RAHIMI YUSOF)**
Pusat Pengajian Pendidikan
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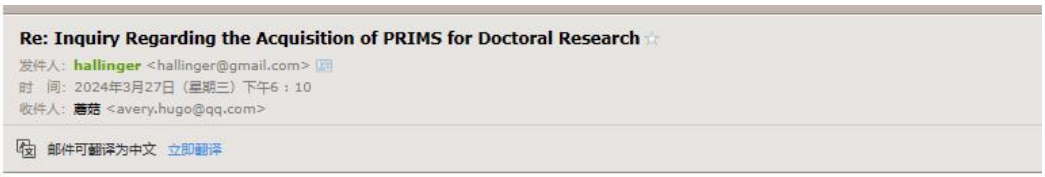
# Appendix C

# Permission to Use Questionnaire



**Re: Inquiry Regarding the Acquisition of PRIMS for Doctoral Research**

发件人: **hallinger** <hallinger@gmail.com>
时　间: 2024年3月27日（星期三）下午6：10
收件人: **蕾蓓** <avery.hugo@qq.com>

邮件可翻译为中文　立即翻译

Dear Zhongmin

You have my permission to use the PIMRS in your research. You now are able to access various PIMRS resources on my website at https://philiphallinger.com/tool/survey/pimrs/a/researcherLogin-2.html

Please enter the following requested information during 2024:

- Research User ID:
- 2024 Password:
- Name: Your **FirstName LastName**
- Email: Your **email address**
- Click the *Submit button*

The webpage contains a variety of resources including:

1. Forms of the English language PIMRS for your copying and adaptation
2. Translated versions of the PIMRS for Malay, Chinese, Arabic, Thai, Persian, Amharic, Portuguese, Spanish, Turkish, Vietnamese
3. Support resources including the Technical Report (new), User Manual (old)
4. PIMRS related articles and book chapters
5. Other instructional leadership articles
6. List and zipped PDF files of 400 PIMRS Studies

Universiti Utara Malaysia

**Re: 沟通满意度问卷使用申请**

时　间: 2023年6月16日（星期三）下午2：07
收件人: 蕾蓓 <avery.hugo@qq.com>
纯文本

钟敏你好，邮件我已收到，问卷你可以使用，预祝科研顺利，学业有成！

---------- 原始邮件 ----------
发件人: 蕾蓓 <avery.hugo@qq.com>
发送时间: 2023年6月10日 14:06
主题: Re: 沟通满意度问卷使用申请

尊敬的曾文媛教授：
展信佳！
我是钟敏，一名正在马来西亚北方大学求学的中国博士留学生，我的专业是教育管理。因为我的研究涉及到探索教师和校长在校沟通的情况，程中需要使用您修改的沟通满意度调查问卷，特发来邮件，希望您能同意我使用该问卷。
祝您工作顺利，万事胜意！

钟敏敬上，
2023年6月10日于马来西亚

**Re: 关于使用教师教学能力问卷的申请**

时　间: 2023年9月9日（星期二）上午12：45
收件人: 蕾蓓 <avery.hugo@qq.com>
纯文本

来信已知悉，问卷可使用，祝学业顺利！

---------- 原始邮件 ----------
发件人: 蕾蓓 <avery.hugo@qq.com>
发送时间: 2023年9月9日 10:41
收件人: Satsuma ❀❀ <3027804888@qq.com>
主题: Re: 关于使用教师教学能力问卷的申请

尊敬的徐继红教授：
展信佳！
我是钟敏，一名正在马来西亚北方大学求学的中国博士留学生，我的专业是教育管理。因为我的研究涉及到探索教师的教学能力测评，在研究过程中需要使用您修改的教师教学能力调查问卷，特发来邮件，希望您能同意我使用该问卷。
祝您工作顺利，万事胜意！

钟敏敬上，
2023年9月9日于马来西亚

# Appendix D

## Questionnaire in English

PUSAT PENGAJIAN PENDIDIKAN
*SCHOOL OF EDUCATION*
College of Arts and Sciences
Universiti Utara Malaysia
06010 UUM SINTOK
KEDAH DARUL AMAN
MALAYSIA

Universiti Utara Malaysia

Tel: 604 - 928 5381
Faks (Fax): 604 - 928 5382
Laman Web (Web): www.cas.uum.edu.my

Dear Teacher,

Greetings! Firstly, we extend our heartfelt gratitude for your participation in this research. This study employs a scientific sampling method, selecting you and your school as subjects for this survey. The aim of the research is to explore the performance of primary school principals in virtual instructional leadership. The findings of this survey will be exclusively utilized for academic research purposes.

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We kindly request that you provide genuine responses to the questionnaire based on your actual experiences and personal opinions. We assure you that all data will be deleted following matching and processing to ensure the anonymity and confidentiality of your personal and school information. Additionally, all research data will be handled in strict accordance with the relevant provisions of the Statistics Law of the People's Republic of China.

Please mark your answers on the corresponding items in the questionnaire.

**Part A: Demography**

The following items pertain to basic information about you and your school. Please select the option that you believe is accurate.

A1. Your Gender:

1. Male; 2. Female

A2. Your Teaching Experience:_____( Fill in the Blanks）

A3. Your Highest Educational Qualification:

1. Associate degree or below
2. Bachelor's degree
3. Master's degree
4. Doctoral degree

A4. Your Professional Title:

1. Not classified
2. Second-level teacher
3. First-level teacher
4. Senior teacher

A5. Your Position:

1. Full-time Teacher

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2. Homeroom Teacher

3. Head of Teaching and Research Department

4. Instructional Director

A6. Gender of the Principal at Your School:

1. Male 2. Female

A7. Does Your School Have Social Media Groups (e.g., QQ/WeChat/DingTalk)?

1. Yes 2. No

A8. Does Your School Have an Official Website or WeChat Public Account?

1. Yes 2. No

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**Part B: Personal Communication and Technology skills**

The following questions pertain to your use and skills related to mobile devices, the internet, and social media. Please select the correct answer.

B1.How many years have you used a smartphone?_____( Fill in the Blanks）

B2. Your Preference for Social Media Apps (Choose one):

1. TikTok (Douyin)

2. Sina Weibo

3. Bilibili

4. Zhihu

5. Xiaohongshu (Little Red Book)

6. Today's headlines

7. Other

B3. What is the Communication Apps Used in Your Work (Choose one):

1. WeChat

2. QQ

3. DingTalk

4. OA (Office Automation)

5. Other

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B4. What is Your Level of Internet Skills:

1. Unfamiliar

2. Basic

3. Proficient

4. Advanced

5. Expert

B5. What is Your Daily Internet Usage Time:_____( Fill in the Blanks）

**Part C: Virtual Instructional Leadership**

Virtual instructional leadership is defined as the behavior of principals executing their instructional leadership using smart devices (e.g., smartphones, computers, tablets etc.) with the help of communication applications (e.g., WeChat, QQ, OA, DingTalk etc.) and social media (e.g., websites, Weibo, public accounts, TikTok etc.). Please select the option that best describes the situation at your school.

Dimension 1. Defining School Mission

1. Sets the School Goals

Virtual instructional leadership is defined as the conduct wherein principals utilize smart devices, aided by communication applications and social media apps, to perform educational leadership functions. Please select the option that best aligns with the situation at your school.

| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| SSG1 | The principal formulates annual goals through virtual resources (e.g., government reports, documents and requirements etc.) | | | | | |
| SSG2 | The school goals formulated by the principal based on virtual resources (e.g., government reports, | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | documents and requirements etc.) are easily understood by teachers | | | | | |
| SSG3 | The principal secures teachers' input into goal development virtually(e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| SSG4 | The principal sets school goals according to teachers' responsibilities through virtual (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| SSG5 | The principal uses online data on student performance when developing the school's academic goals | | | | | |

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2. Communicates the School's Goals

| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| CSG1 | The principal effectively communicates the school's goals virtually (e.g., by WeChat, QQ, OA, DingTalk, etc.) to its members | | | | | |
| CSG2 | The principal discusses academic objectives with teachers virtually (e.g., by WeChat, QQ, OA, DingTalk, etc.) in informal settings | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| CSG3 | The principal deliberates on the school's academic goals with teachers during school meetings through online platform (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| CSG4 | The principal ensures the school's goals are published on the official website or other virtual platforms | | | | | |
| CSG5 | The principal disseminates the school's goals to the community through online platform (e.g., by WeChat, QQ, OA, DingTalk, or posting to a website, etc.) | | | | | |
| CSG6 | When make curriculum decisions with teachers, the principal refers to the school's goals virtually (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |

Dimension 2. Managing Instructional Programs

3. Supervises and Evaluate Instruction

| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|

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| | | | | | | |
|---|---|---|---|---|---|---|
| SEI1 | The principal frequently observes teachers' teaching through a virtual platform (e.g., by online supervision etc.) | | | | | |
| SEI2 | The principal ensures that teachers' teaching focus aligns with the school's goals through a virtual platform (e.g., by online supervision etc.) | | | | | |
| SEI3 | The principal reviews students' assignments when supervising teachers' teaching through a virtual platform (e.g., by online supervision etc.) | | | | | |
| SEI4 | The principal will provide teachers with online feedback (e.g., by WeChat, QQ, OA, DingTalk, etc.) on the outstanding parts of teaching after the teaching supervision | | | | | |
| SEI5 | The principal will provide teachers with online feedback (e.g., by WeChat, QQ, OA, DingTalk, etc.) on the weak parts of teaching after the teaching supervision | | | | | |
| SEI6 | The principal encourages teachers to utilize mobile devices and social media for diverse teaching approaches | | | | | |
| SEI7 | The principal evaluates teachers' teaching through virtual means (e.g.: online supervision etc.) according to the school's goals | | | | | |

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4. Monitors Student Progress

| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| MSP1 | The principal oversees and focuses on students' academic progress | | | | | |
| MSP2 | The principal discusses students' academic performance with teachers individually through a virtual platform (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| MSP3 | The principal evaluates the progress of school goals through a virtual platform (e.g., by WeChat, QQ, OA, DingTalk, etc.) based on outcomes of assessments | | | | | |
| MSP4 | The principal adjusts the school's instructional plans based on test results virtually （such as online databases） | | | | | |

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5. Integrates mobile device technology

| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| IMDT1 | The principal utilizes online communication apps such as WeChat, QQ, DingTalk, etc. for interactions. | | | | | |
| IMDT2 | The principal encourages staff to use WeChat official accounts, Weibo, or the school's official website | | | | | |
| IMDT3 | The principal advocates for teachers to share and edit information online, such as using Word documents for collaborative online editing and sharing | | | | | |
| IMDT4 | The principal promotes the use of the internet among teachers to access teaching information | | | | | |
| IMDT5 | The school is equipped with a comprehensive internet infrastructure and Wi-Fi network | | | | | |
| IMDT6 | The principal supports teachers to engage in online learning | | | | | |
| IMDT7 | The principal is committed to improving the school's internet infrastructure and Wi-Fi network | | | | | |

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Dimension 3. Developing the school learning climate

6. Provides incentives to teachers

| | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| PIT1 | The principal publicizes teachers' contributions to school through a virtual platform (e.g., by WeChat, QQ, OA, DingTalk, or posting to a web page, etc.) | | | | | |
| PIT2 | The principal records teacher's outstanding performance through a virtual platform (such as posting to OA or school's webpage, etc.) | | | | | |
| PIT3 | The principal publicly praises teachers' efforts and progress through a virtual platform (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| PIT4 | The principal privately praises teachers' efforts and progress through a virtual platform (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| PIT5 | The principal rewards teachers' efforts by offering professional development opportunities such as | | | | | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | online training | | | | | |

7. Promotes professional development

| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| PPD1 | The principal informs teachers about opportunities for professional development through a virtual platform e.g., by WeChat, QQ, OA, DingTalk, or posting to a web page, etc.) | | | | | |
| PPD2 | The principal leads or participates in activities related to teachers' professional growth through a virtual platform (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| PPD3 | The principal supports teachers' requests for further online training aligned with the school's goals | | | | | |
| PPD4 | The principal actively encourages teachers to apply informational skills acquired from advanced training in the classroom | | | | | |
| PPD5 | During online meetings, the principal allocates time for teachers to share information and | | | | | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | experiences gained from professional training | | | | | |

8. Provides incentives to students

| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| PIS1 | The principal recognizes outstanding students through formal virtual rewards, such as publishing their achievements on school's official website and other virtual platforms | | | | | |
| PIS2 | The principal contacts parents through WeChat, QQ, etc. to communicate students' excellent performance | | | | | |
| PIS3 | The principal encourages teachers to praise students with outstanding performance through virtual platform such as WeChat, QQ, OA, Dingtalk, etc. | | | | | |
| PIS4 | The principal recognizes students' excellent performance through online school meetings | | | | | |
| PIS5 | The principal utilizes online platforms such as websites, QQ, and WeChat to publicize students' achievements | | | | | |

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9. Community Engagement

| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| CE1 | The principal consistently maintains good relationships with the community and stakeholders through online platforms such as QQ and WeChat | | | | | |
| CE2 | The principal discloses school information and activities to the community and stakeholders through school websites, QQ, WeChat, etc. | | | | | |
| CE3 | The principal establishes specialized websites or online groups, such as QQ or WeChat, for the community and stakeholders | | | | | |
| CE4 | The principal actively cooperates with the community through QQ, WeChat, etc. to promote school development | | | | | |
| CE5 | The principal collaborates online with top external institutions and educators to enhance the school's performance | | | | | |

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**Part D：Communication Patterns**

This part focuses on how principals and teachers utilize smart devices (such as smartphones, iPads, etc.) and social media applications (like QQ, WeChat, DingTalk, OA, etc.) for effective online communication. Please select the option that best reflects your perspective.

Dimension 1: Upward Communication

The Upward Communication specifically refers to the process where teachers report to principals, convey key information, and express personal opinions through smart devices and social media applications.

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| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| UC1 | Teachers often convey information to principal through online platforms (e.g., WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| UC2 | The principal gives good feedback to teachers' opinions through virtual platforms (e.g., WeChat, QQ, OA, | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | DingTalk, etc.) | | | | | |
| UC3 | Teachers can freely express their work comments and suggestions to principal through virtual platforms (e.g., WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| UC4 | The principal consistently offers teachers opportunities to share their opinions and ideas on virtual platforms like QQ, WeChat, DingTalk, OA, etc. | | | | | |
| UC5 | The informal communication channels between teachers and principal (e.g., WeChat, QQ, OA, DingTalk, etc.) are unobstructed | | | | | |

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Dimension 2: Downward Communication

| Item | Statement | Strongly Disagree (1) | Disagree (3) | Neither Disagree Nor Agree (3) | Agree (5) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| DC1 | The principal conveys work instructions or information through | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | virtual platforms (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| DC2 | The principal communicates clear information through virtual platforms (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| DC3 | The principal consistently provides necessary information to teachers through virtual platforms (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| DC4 | Teachers always receive information on time through virtual platforms (e.g., by WeChat, QQ, OA, DingTalk, etc.) before performing work | | | | | |
| DC5 | The principal clearly communicates the school's goals through virtual platforms (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| DC6 | The instructions issued by the principal through | | | | | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | virtual platforms (e.g., by WeChat, QQ, OA, DingTalk, etc.) are always easy to understand | | | | | |

The Downward Communication specifically refers to the process where school leaders disseminating information to staff.

Dimension 3: Horizontal Communication

The Horizontal Communication specifically refers to the process of mutual communication between teachers.

| Item | Statement | Strongly Disagree (1) | Disagree (4) | Neither Disagree Nor Agree (3) | Agree (6) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| HC1 | Teachers can freely express dissatisfaction among colleagues through virtual platforms (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| HC2 | The principal's open communication attitude on online platforms (e.g., by WeChat, QQ, OA, DingTalk, etc.) makes teachers feel happy at work | | | | | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| HC3 | Teachers are clearly informed about the performance evaluation process through online platforms (e.g., by WeChat, QQ, OA, DingTalk, etc.) | | | | | |
| HC4 | In emergencies, teachers can use various online or offline communication methods | | | | | |
| HC5 | The principal always discusses with teachers through online platforms (e.g., by WeChat, QQ, OA, DingTalk, etc.) before making decisions | | | | | |

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**Part E：Teachers' Teaching Competency**

Below are descriptions regarding teachers' teaching competencies. Please select the option that best reflects your perspective.

Dimension 1. Professionalism characteristics

| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| PC1 | I feel a strong sense of belonging to my school | | | | | |
| PC2 | I will adopt appropriate teaching methods according to the students' academic level | | | | | |
| PC3 | I am confident in my ability to teach effectively | | | | | |
| PC4 | I excel in teaching effectively | | | | | |
| PC5 | I consistently provide accurate feedback based on teaching situations | | | | | |
| PC6 | I frequently reflect on my teaching practices | | | | | |
| PC7 | The internet assists me in developing lesson plans | | | | | |

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Dimension 2 . Teaching skills

| Item | Statement | Strongly Disagree (1) | Disagree (3) | Neither Disagree Nor Agree (3) | Agree (5) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| TS1 | I am knowledgeable about various learning theories | | | | | |
| TS2 | I consistently select teaching techniques based on the syllabus | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| TS3 | I always listen to and respond to students' questions | | | | | |
| TS4 | I consistently identify and correct students' misunderstandings of course content | | | | | |
| TS5 | I always assess students' understanding of the course through quizzes | | | | | |

Dimension 3. Classroom climate

| Item | Statement | Strongly Disagree (1) | Disagree (2) | Neither Disagree Nor Agree (3) | Agree (4) | Strongly Agree (5) |
|---|---|---|---|---|---|---|
| CC1 | I always listen to students' suggestions | | | | | |
| CC2 | I always provide feedback on students' questions | | | | | |
| CC3 | After class, I always communicate with students through social media apps such as WeChat, QQ, and DingTalk, etc. | | | | | |
| CC4 | I provide online guidance to students | | | | | |

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## Appendix E

## Questionnaire in Chinese

PUSAT PENGAJIAN PENDIDIKAN
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# 重庆小学校长虚拟教学领导力与教师教学能力的情况调查问卷

尊敬的老师：

您好！非常感谢您帮助我们填写问卷。经科学抽样，我们选择您和贵校作为调查对象。本次调查意在了解小学校长虚拟教学领导力的情况，结果仅作研究使用，请根据自己真实想法和学校实际情况回答问题即可。

我们郑重承诺，您和贵校信息在几份问卷关联、匹配之后将被删除，任何信息将无法被他人识别，并且所有调研信息将按照《中华人民共和国统计法》相关规定予以严格保密。

请您根据真实情况，在所选题项上划钩。

一、学校基本信息：

以下是一些关于您和学校的基本信息，请选择您认为正确的信息。

1. 您的性别： [单选题] *

1.男

2.女

2. 您的教龄：_____ [填空题] *

3. 您的最高学历： [单选题] *

1. 大专及以下
2. 本科
3. 硕士研究生
4. 博士研究生

4. 您的职称： [单选题] *

1. ○未定级
2. ○二级教师
3. ○一级教师
4. ○高级教师

5. 您的职务： [单选题] *

1. 专任教师
2. 班主任
3. 教研室主任
4. 教导主任

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6. 您所在学校正校长的性别：[单选题] *

1. 男
2. 女

7. 您的学校是否有 QQ/微信/钉钉等社交 app 群： [单选题] *

1. 有
2. 无

8. 您的学校是否拥有官方网页、微信公众号等线上平台： [单选题] *

1. 有
2. 无

二、个人网络技能

下列有关您对移动设备、互联网和社交媒体的使用和技能的问题，请选择您认为正确的答案。

9. 您累计使用智能手机有_____年？ [填空题]*

10. 您使用社交媒体 app 的倾向（选择一个）：[单选题] *

1. 抖音
2. 新浪微博
3. bilibili 哔哩哔哩
4. 知乎
5. 小红书
6. 今日头条
7. 其他

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11. 您在工作中常用的通信应用 app（选择一个）：[单选题] *

1. 微信
2. QQ
3. 钉钉
4. OA
5. 其他

12. 您的互联网技能水平：[单选题] *

1. 不了解
2. 一般
3. 熟练
4. 精通
5. 专家

13. 您每天累计上网的时间有_____小时？[填空题]*

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三：虚拟教学领导

虚拟教学领导被定义为校长使用智能设备，在通信应用程序和社交媒体的帮助下，执行教学领导职能的行为，请选择最符合贵校情况的选项。

维度 1.定义学校目标

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 1.校长会参考线上资源（如政府报告、文件、 | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 要求等）来制定一套有针对性的年度教育教学目标 | | | | | |
| 2.校长根据线上资源（如政府报告、文件、要求等）制定的教育教学目标是便于教师理解和执行的 | | | | | |
| 3.校长会让教师们通过虚拟平台(如使用微信、QQ、OA、钉钉等）来参与制定学校的教育教学目标 | | | | | |
| 4.校长会根据教师的责任，通过虚拟平台（如使用微信、qq、OA、钉钉等）来制定教育教学目标 | | | | | |
| 5.校长会通过虚拟平台（如线上数据库等）参考学生的成绩数据，辅助制定学校教育教学目标 | | | | | |

维度 2. 解释学校目标的情况

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 6.校长会通过虚拟平台（如使用微信、qq、OA、钉钉等)有效地将学校的教育教学目标传达给学 | | | | | |

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|---|---|---|---|---|---|
| 校成员 | | | | | |
| 7.校长会使用微信、QQ、OA、钉钉等虚拟软件，私下与老师讨论学校的教育教学目标 | | | | | |
| 8.校长会通过虚拟平台（如腾讯会议、钉钉会议等）与教师召开会议，讨论学校的教育教学目标 | | | | | |
| 9.校长会确保学校的教育教学目标被上传到学校的官网、公众号或其他网页上 | | | | | |
| 10.校长会通过虚拟平台（如微信、QQ、OA、钉钉、网页、公众号等）将学校的教育教学目标分享、传达到社区 | | | | | |
| 11.校长与教师一起制定课程决策时，会通过虚拟平台（如学校官网、公众号、在线数据库等）参考学校的教育教学目标 | | | | | |

维度 3. 监督和评估教学

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 12.校长会经常通过虚拟平台（如在线督导）进行随堂听课 | | | | | |
| 13.校长在线督导教学时，会确保教师的课堂重 | | | | | |

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|---|---|---|---|---|---|
| 点与学校的目标一致 | | | | | |
| 14.校长在线监督教师教学时，会检查学生的作业情况 | | | | | |
| 15.校长会在教学督导后通过虚拟平台（如使用微信、QQ、OA、钉钉等）向教师反馈教学的优秀部分 | | | | | |
| 16.校长会在教学督导后通过虚拟平台（如使用微信、QQ、OA、钉钉等）向教师反馈教学的不足部分 | | | | | |
| 17.校长会鼓励教师借助移动设备和社交媒体来使用不同的教学方法 | | | | | |
| 18. 校长会通过虚拟方式（如进行线上监督）来评估教师的教学是否与学校目标一致 | | | | | |

维度 4. 监督学生进步

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 19.校长长会通过线上、线下多种途径来关注学生的学业进步 | | | | | |

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|---|---|---|---|---|---|
| 20.校长会通过虚拟平台( 如使用微信 、QQ 、OA 、钉钉等 ) 单独跟教师讨论学生的学业情况 | | | | | |
| 21.校长会通过虚拟平台( 如使用微信 、QQ 、OA 、钉钉等 ) 来了解学生的学业情况，进而评估学校教育教学目标的完成情况 | | | | | |
| 22.校长会通过虚拟平台( 如在线数据库 ) 了解学生成绩，进而调整学校的教学计划 | | | | | |

维度 5. 学校融合移动设备

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 23.校长会经常使用线上通信，如微信 、QQ 、钉钉 、OA 等方式进行沟通 | | | | | |
| 24.校长会鼓励教职工在工作中使用学校的微信公众号、微博或官方网站 | | | | | |
| 25.校长会鼓励教师在线共享信息，如使用在线文档进行线上分享和编辑 | | | | | |
| 26.校长会鼓励教师通过网络获取教学资料 | | | | | |
| 28. 校长会支持和鼓励教师进行线上学习 | | | | | |
| 29. 校长会完善学校的互联网基础设施和无线网络 | | | | | |

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维度 6. 激励教师

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 30.校长会通过虚拟平台（如使用微信、QQ、OA、钉钉或发布到官网等方式）来宣传教师对学校的贡献 | | | | | |
| 31.校长会通过在线方式（如发布到 OA 或学校官网等）来记录教师的出色表现 | | | | | |
| 32.校长会通过 QQ、微信、OA、钉钉等方式公开表扬教师的努力和进步 | | | | | |
| 33.校长会通过微信、QQ、OA、钉钉等在私下表扬教师的努力和进步 | | | | | |
| 34.校长会通过提供专业发展机会（如在线进修等）奖励教师的努力 | | | | | |

维度 7. 促进教师的专业发展

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 35.校长会通过虚拟平台（如使用微信、QQ、OA、钉钉等）通知教师专业发展的机会 | | | | | |

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|---|---|---|---|---|---|
| 36.校长会通过虚拟平台（如使用微信、QQ、OA、钉钉等）组织或参加与教师专业发展有关的活动 | | | | | |
| 37.校长支持教师提出的符合学校教育教学目标的在线进修请求 | | | | | |
| 38.校长积极支持教师在课堂上应用进修培训中获得的信息化技能 | | | | | |
| 39.线上会议时，校长会安排时间让教师分享专业培训中获得的信息和经验 | | | | | |

维度 8 激励学生

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 40. 校长会将学生的荣誉信息发布在学校官网，来表彰表现优异的学生 | | | | | |
| 41. 校长会通过微信、QQ 等方式联系学生家长，传达学生的优异表现 | | | | | |
| 42. 校长会通过微信、QQ、钉钉、OA 等线上平台鼓励教师表扬优秀的学生 | | | | | |
| 43.校长会通过线上会议来表彰学生的优异表现 | | | | | |

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|---|---|---|---|---|---|
| 44. 校长会利用网站、QQ、微信、公众号等线上方式宣传学生的成就 | | | | | |

维度 9. 寻求社区支持

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 45. 校长会通过 QQ、微信等线上方式与校友、社区和利益相关者维持良好的关系 | | | | | |
| 46. 校长会通过公众号、学校官网、QQ、微信等方式向社区和利益相关者公开学校的信息和活动 | | | | | |
| 47. 校长会为社区或利益相关者建立专门的网站或 QQ、微信群 | | | | | |
| 48. 校长会通过 QQ、微信等主动与社区合作以促进学校发展 | | | | | |
| 49. 校长会与校外优秀的机构和教师进行在线合作，以提升学校的水平 | | | | | |

四、沟通模式

本部分聚焦于校长与教师之间如何利用智能设备（如手机、ipad 等）和社交媒体软件（如 QQ、微信、钉钉、OA 等）进行有效的线上沟通。请从选择一个最能反映您观点的选项。

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维度 1：上行沟通模式

上行沟通模式专指教师通过智能设备和社交媒体软件向校长汇报工作、传递关键信息以及表达个人意见的过程。

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 1. 教师经常通过 QQ、微信、钉钉、OA 等虚拟平台向校长传递信息 | | | | | |
| 2. 校长会通过 QQ、微信、钉钉、OA 等虚拟平台对教师的意见给予良好的反馈 | | | | | |
| 3. 教师们可以通过 QQ、微信、钉钉、OA 等虚拟平台自由地向校长表达对工作的意见和建议 | | | | | |
| 4. 校长总是鼓励教师们在 QQ、微信、钉钉、OA 等虚拟平台上发表自己的意见或想法 | | | | | |
| 5. 教师和校长之间的非正式沟通渠道（如 QQ、微信、钉钉、OA 等）是双向畅通的 | | | | | |

维度 2. 向下沟通模式

指校长通过智能设备和社交媒体软件向教师传达信息和意见的过程

| | 很不符 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|

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| | | | | | |
|---|---|---|---|---|---|
| | 合 | | | | |
| 6. 校长会通过 QQ、微信、OA、钉钉等虚拟平台传达工作指示或信息 | | | | | |
| 7. 校长通过 QQ、微信、钉钉、OA 等虚拟平台传达的信息是清晰且明确的 | | | | | |
| 8. 校长不断通过如 QQ、微信、钉钉、OA 等虚拟平台向教师们提供必要的信息 | | | | | |
| 9.教师们在开展工作前，总会通过 QQ、微信、钉钉、OA 等虚拟平台及时收到工作相关的信息 | | | | | |
| 10. 校长通过 QQ、微信、钉钉、OA 等虚拟平台清晰地传达了学校的教育教学目标 | | | | | |
| 11. 校长通过 QQ、微信、钉钉、OA 等发布的工作指示始终是便于理解的 | | | | | |

维度 3. 横向沟通模式

指教师之间通过智能设备和社交媒体软件来进行相互沟通的情况

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 12.教师之间可以通过虚拟平台如 QQ、微信、OA、 | | | | | |

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|---|---|---|---|---|---|
| 钉钉等自由地表达工作中的意见和建议 | | | | | |
| 13. 校长在 QQ、微信、钉钉、OA 等虚拟平台开放的沟通态度，会让教师们在工作中感到愉悦 | | | | | |
| 14. 教师们会通过 QQ、微信、钉钉、OA 等虚拟平台清楚地了解绩效考核的评估过程 | | | | | |
| 15. 在面对紧急情况的时候，教师们可以采取线上、线下的多种沟通方式 | | | | | |
| 16. 校长在做决定之前，总是通过 QQ、微信、钉钉、OA 等虚拟平台与教师们进行讨论 | | | | | |

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**五、教师教学能力**

**以下是有关教师教学能力的情况的描述，请选择最能体现您观点的选项。**

维度 1. 教师的专业精神

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 1. 我对学校有很高的归属感 | | | | | |
| 2. 我会根据学生的成绩水平采取相适应的教学方法 | | | | | |
| 3. 我有信心能有效地进行教学 | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 4. 我很擅长有效地进行教学 | | | | | |
| 5. 我总能根据教学情况给出准确的反馈 | | | | | |
| 6. 我时常对教学进行反思 | | | | | |
| 7. 互联网能帮助我制定教案和教学计划 | | | | | |

维度 2 教学技能

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 8. 我了解很多与教学相关的知识 | | | | | |
| 9. 我始终根据大纲来选择教学技术 | | | | | |
| 10. 对于学生在课堂上提出的学习问题，我总是倾听并给予回答 | | | | | |
| 11. 我总是会找出学生对课程内容的误解，并进行纠正 | | | | | |
| 12.我总是通过课堂测试了解学生的对课程的了解程度 | | | | | |

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维度 3 课堂氛围

| | 很不符合 | 不符合 | 一般 | 符合 | 很符合 |
|---|---|---|---|---|---|
| 13. 我总是倾听学生提出的问题、想法和建议 | | | | | |
| 14. 只要学生提出问题，我都会给予及时反馈 | | | | | |
| 15. 课后，我总是通过微信、QQ、钉钉等社交媒体 apps 与学生进行线上交流 | | | | | |
| 16. 我会在线上指导和帮助学生学习 | | | | | |

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# Appendix F

## Total Variance Explained of Three Variables

i. Total Variance Explained of virtual instructional leadership

**Total Variance Explained**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 27.927 | 56.994 | 56.994 | 27.927 | 56.994 | 56.994 | 22.531 | 45.982 | 45.982 |
| 2 | 3.033 | 6.190 | 63.184 | 3.033 | 6.190 | 63.184 | 6.712 | 13.697 | 59.679 |
| 3 | 2.298 | 4.690 | 67.874 | 2.298 | 4.690 | 67.874 | 3.338 | 6.812 | 66.491 |
| 4 | 1.980 | 4.040 | 71.914 | 1.980 | 4.040 | 71.914 | 2.113 | 4.312 | 70.802 |
| 5 | 1.489 | 3.039 | 74.953 | 1.489 | 3.039 | 74.953 | 1.615 | 3.296 | 74.099 |
| 6 | 1.216 | 2.481 | 77.434 | 1.216 | 2.481 | 77.434 | 1.378 | 2.811 | 76.910 |
| 7 | 1.129 | 2.304 | 79.738 | 1.129 | 2.304 | 79.738 | 1.179 | 2.406 | 79.316 |
| 8 | 1.055 | 2.154 | 81.891 | 1.055 | 2.154 | 81.891 | 1.153 | 2.353 | 81.669 |
| 9 | 1.008 | 2.057 | 83.949 | 1.008 | 2.057 | 83.949 | 1.117 | 2.280 | 83.949 |
| 10 | .933 | 1.904 | 85.853 | | | | | | |
| 11 | .853 | 1.741 | 87.593 | | | | | | |
| 12 | .699 | 1.426 | 89.020 | | | | | | |
| 13 | .650 | 1.326 | 90.346 | | | | | | |
| 14 | .558 | 1.138 | 91.484 | | | | | | |
| 15 | .438 | .894 | 92.378 | | | | | | |
| 16 | .387 | .790 | 93.167 | | | | | | |
| 17 | .359 | .733 | 93.901 | | | | | | |
| 18 | .334 | .682 | 94.582 | | | | | | |
| 19 | .255 | .519 | 95.102 | | | | | | |
| 20 | .248 | .507 | 95.608 | | | | | | |
| 21 | .226 | .461 | 96.070 | | | | | | |
| 22 | .206 | .421 | 96.491 | | | | | | |
| 23 | .186 | .379 | 96.870 | | | | | | |
| 24 | .163 | .333 | 97.203 | | | | | | |
| 25 | .149 | .304 | 97.507 | | | | | | |
| 26 | .129 | .262 | 97.770 | | | | | | |

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|---|---|---|---|
| 27 | .120 | .246 | 98.015 |
| 28 | .114 | .233 | 98.248 |
| 29 | .103 | .209 | 98.457 |
| 30 | .101 | .206 | 98.663 |
| 31 | .091 | .185 | 98.849 |
| 32 | .084 | .172 | 99.021 |
| 33 | .072 | .148 | 99.169 |
| 34 | .058 | .119 | 99.287 |
| 35 | .055 | .112 | 99.399 |
| 36 | .049 | .100 | 99.498 |
| 37 | .042 | .087 | 99.585 |
| 38 | .040 | .082 | 99.667 |
| 39 | .029 | .060 | 99.727 |
| 40 | .029 | .059 | 99.786 |
| 41 | .026 | .053 | 99.839 |
| 42 | .024 | .048 | 99.887 |
| 43 | .016 | .032 | 99.919 |
| 44 | .014 | .028 | 99.947 |
| 45 | .010 | .021 | 99.968 |
| 46 | .009 | .018 | 99.986 |
| 47 | .005 | .010 | 99.996 |
| 48 | .001 | .002 | 99.999 |
| 49 | .001 | .001 | 100.000 |

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ii. Total Variance Explained of Communication patterns

**Total Variance Explained**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 11.246 | 70.286 | 70.286 | 11.246 | 70.286 | 70.286 | 5.029 | 31.434 | 31.434 |
| 2 | 2.071 | 12.945 | 83.231 | 2.071 | 12.945 | 83.231 | 4.801 | 30.005 | 61.439 |
| 3 | 1.032 | 6.447 | 89.678 | 1.032 | 6.447 | 89.678 | 4.518 | 28.239 | 89.678 |
| 4 | .373 | 2.331 | 92.010 | | | | | | |
| 5 | .272 | 1.698 | 93.708 | | | | | | |
| 6 | .209 | 1.308 | 95.015 | | | | | | |
| 7 | .167 | 1.046 | 96.061 | | | | | | |
| 8 | .143 | .891 | 96.953 | | | | | | |
| 9 | .114 | .715 | 97.667 | | | | | | |
| 10 | .100 | .624 | 98.291 | | | | | | |
| 11 | .072 | .447 | 98.738 | | | | | | |
| 12 | .061 | .382 | 99.120 | | | | | | |
| 13 | .050 | .314 | 99.434 | | | | | | |
| 14 | .042 | .263 | 99.697 | | | | | | |
| 15 | .027 | .167 | 99.864 | | | | | | |
| 16 | .022 | .136 | 100.000 | | | | | | |

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iii. The Total Variance Explained of teachers' teaching competency

**Total Variance Explained**

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 14.087 | 70.436 | 70.436 | 14.087 | 70.436 | 70.436 | 6.909 | 34.547 | 34.547 |
| 2 | 2.221 | 11.103 | 81.539 | 2.221 | 11.103 | 81.539 | 5.328 | 26.642 | 61.189 |
| 3 | 1.030 | 5.148 | 86.687 | 1.030 | 5.148 | 86.687 | 5.100 | 25.498 | 86.687 |
| 4 | .875 | 4.375 | 91.062 | | | | | | |
| 5 | .309 | 1.545 | 92.608 | | | | | | |
| 6 | .241 | 1.207 | 93.815 | | | | | | |
| 7 | .214 | 1.071 | 94.886 | | | | | | |
| 8 | .170 | .848 | 95.733 | | | | | | |
| 9 | .151 | .755 | 96.489 | | | | | | |
| 10 | .136 | .681 | 97.170 | | | | | | |
| 11 | .114 | .570 | 97.740 | | | | | | |
| 12 | .099 | .497 | 98.593 | | | | | | |
| 13 | .071 | .357 | 98.905 | | | | | | |
| 14 | .062 | .311 | 99.771 | | | | | | |
| 15 | .050 | .252 | 99.901 | | | | | | |
| 16 | .049 | .244 | 100.000 | | | | | | |

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# Appendix G

## Rotated Component Matrix of Three Variables

i. Rotated Component Matrix of virtual instructional leadership

N=100. Rotated Component Matrix

| | Item Statement | Factor | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $h^2$ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| **Dimension 1:** Sets the School Goals (SSG) | | | | | | | | | | | |
| 1. | SSG1 | .954 | .804 | | | | | | | | |
| 2. | SSG2 | .962 | .778 | | | | | | | | |
| 3. | SSG3 | .950 | .723 | | | | | | | | |
| 4. | SSG4 | .949 | .751 | | | | | | | | |
| 5. | SSG5 | .947 | .629 | | | | | | | | |
| **Dimension 2:** Communicates the School's Goals (CSG) | | | | | | | | | | | |
| 6. | CSG1 | .889 | | .528 | | | | | | | |
| 7. | CSG2 | .963 | | .785 | | | | | | | |
| 8. | CSG3 | .921 | | .508 | | | | | | | |
| 9. | CSG4 | .926 | | .550 | | | | | | | |
| 10. | CSG5 | .950 | | .570 | | | | | | | |
| 11. | CSG6 | .954 | | .538 | | | | | | | |
| **Dimension 3:** Supervises and Evaluates Instruction (SEI) | | | | | | | | | | | |
| 12. | SEI1 | .941 | | | .733 | | | | | | |
| 13. | SEI2 | .937 | | | .686 | | | | | | |
| 14. | SEI3 | .911 | | | .664 | | | | | | |
| 15. | SEI4 | .933 | | | .585 | | | | | | |

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| | | | | |
|---|---|---|---|---|
| 16. | SEI5 | .919 | .577 | |
| 17. | SEI6 | .963 | .592 | |
| 18. | SEI7 | .958 | .627 | |
| **Dimension 4:** Monitors Student Progress (MSP) | | | | |
| 19. | MSP1 | .933 | .561 | |
| 20. | MSP2 | .927 | .573 | |
| 21. | MSP3 | .942 | .529 | |
| 22. | MSP4 | .905 | .603 | |
| **Dimension 5:** Integrates Mobile Device Technology (IMDT) | | | | |
| 23. | IMDT1 | .911 | .683 | |
| 24. | IMDT2 | .960 | .770 | |
| 25. | IMDT3 | .968 | .789 | |
| 26. | IMDT4 | .962 | .793 | |
| 27. | IMDT5 | .909 | .819 | |
| 28. | IMDT6 | .960 | .783 | |
| 29. | IMDT7 | .956 | .812 | |
| **Dimension 6** Provides Incentives to Teachers (PIT) | | | | |
| 30. | PIT1 | .932 | .601 | |
| 31. | PIT2 | .947 | .612 | |
| 32. | PIT3 | .940 | .635 | |
| 33. | PIT4 | .891 | .618 | |
| 34. | PIT5 | .903 | .553 | |
| **Dimension 7** Promotes Professional Development (PPD) | | | | |
| 35. | PPD1 | .944 | .537 | |
| 36. | PPD2 | .937 | .622 | |
| 37. | PPD3 | .922 | .588 | |

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|---|---|---|---|---|---|---|---|---|---|
| 38. | PPD4 | .951 | | | | .606 | | | |
| 39. | PPD5 | .895 | | | | .611 | | | |
| **Dimension 8** Provides Incentives to Students (PIS) | | | | | | | | | |
| 40. | PIS1 | .938 | | | | | .585 | | |
| 41. | PIS2 | .921 | | | | | .680 | | |
| 42. | PIS3 | .941 | | | | | .659 | | |
| 43. | PIS4 | .946 | | | | | .664 | | |
| 44. | PIS5 | .922 | | | | | .706 | | |
| **Dimension 9** Community Engagement (CE) | | | | | | | | | |
| 45. | CE1 | .958 | | | | | | | .721 |
| 46. | CE2 | .974 | | | | | | | .708 |
| 47. | CE3 | .949 | | | | | | | .678 |
| 48. | CE4 | .982 | | | | | | | .743 |
| 49. | CE5 | .968 | | | | | | | .719 |
| **Eigenvalues** | | 27.927 | 3.033 | 2.298 | 1.980 | 1.489 | 1.216 | 1.129 | 1.055 | 1.008 |

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ii. Rotated Component Matrix of Communication patterns

| N=100. Rotated Component Matrix | | | | | |
|---|---|---|---|---|---|
| Item Statement | | Factor | | | |
| | | $h^2$ | 1 | 2 | 3 |
| **Dimension 1:** Upward Communication (UC) | | | | | |
| 1. | UC1 | .929 | .786 | | |
| 2. | UC2 | .892 | .613 | | |
| 3. | UC3 | .897 | .751 | | |
| 4. | UC4 | .925 | .627 | | |
| 5. | UC5 | .920 | .608 | | |
| **Dimension 2:** Downward Communication (DC) | | | | | |
| 6. | DC1 | .950 | | .836 | |
| 7. | DC2 | .928 | | .830 | |
| 8. | DC3 | .955 | | .765 | |
| 9. | DC4 | .959 | | .803 | |
| 10. | DC5 | .968 | | .824 | |
| 11. | DC6 | .969 | | .807 | |
| **Dimension 3:** Horizontal Communication (HC) | | | | | |
| 12. | HC1 | .937 | | | .716 |
| 13. | HC2 | .936 | | | .748 |
| 14. | HC3 | .909 | | | .738 |
| 15. | HC4 | .921 | | | .689 |
| 16. | HC5 | .954 | | | .784 |
| | **Eigenvalues** | | 11.246 | 2.071 | 1.032 |

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iii. The Rotated Component Matrix of teacher's teaching competency

N=100. Rotated Component Matrix

| | Item Statement | Factor | | | |
|---|---|---|---|---|---|
| | | $h^2$ | 1 | 2 | 3 |
| **Dimension 1:** Professionalism Characteristics (PC) | | | | | |
| 1. | PC1 | 0.860 | 0.690 | | |
| 2. | PC2 | 0.865 | 0.674 | | |
| 3. | PC3 | 0.855 | 0.796 | | |
| 4. | PC4 | 0.884 | 0.821 | | |
| 5. | PC5 | 0.844 | 0.602 | | |
| 6. | PC6 | 0.924 | 0.627 | | |
| 7. | PC7 | 0.854 | 0.745 | | |
| **Dimension 2:** Teaching Skills (TS) | | | | | |
| 8. | TS1 | 0.873 | | 0.703 | |
| 9. | TS2 | 0.909 | | 0.866 | |
| 10. | TS3 | 0.906 | | 0.670 | |
| 11. | TS4 | 0.939 | | 0.644 | |
| 12. | TS5 | 0.878 | | 0.667 | |
| **Dimension 3:** Classroom Climate (CC) | | | | | |
| 13. | CC1 | 0.904 | | | 0.623 |
| 14. | CC2 | 0.916 | | | 0.640 |
| 15. | CC3 | 0.786 | | | 0.632 |
| 16. | CC4 | 0.874 | | | 0.608 |
| | **Eigenvalues** | | 12.888 | 3.645 | 2.703 |

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