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# Assessing the Impact of Technology Use on the Professional Development of Rural School Teachers in China

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***Abstract***

*The focus explored the relationship between the technology used by Chinese rural school teachers and their professional development perceived by them. 200 rural school teachers in China were selected by convenience sampling for this study. Quantitative survey questionnaires were conducted for data collection, and data was analysed using statistical measures. The results of the study revealed that rural school teachers in China reported a high-level use of technology in their teaching lives and their perception of professional development lay in the average range. Furthermore, a significant correlation was found between technology use and the professional development of rural school teachers in China. Additionally, gender differences in the trends of technology use and professional development of male and female teachers were also analysed. It was noted that male teachers had significantly higher technology use and corresponding higher feelings of professional development compared to female rural school teachers. The study has presented policy suggestions for the government and policy framers in how they can design strategies to ensure the optimal and beneficial use of technology for ascertaining the professional development of teachers and improving the overall quality of education in rural schools.*

***Keywords:*** *Technology Use, Professional Development, Rural School Teachers, Convenience Sampling t-test, Correlation, Regression.*

## INTRODUCTION

Ensuring high standards of education is a priority among countries across the globe to make sure their future developmental goals are appropriately met through a skilled and aware workforce. For this, governments frame policies and adopt strategies that make equal and equitable education accessible to all students to ensure their holistic growth while also ensuring the professional development of their teachers (Russell, 2014). In contemporary times, with technological expansion and increasing use of technical devices and tools in education, the field of education has transformed immensely, particularly in developed and developing countries with vast economic capacities such as China (Huang, 2019). In China, the integration of technology in education has increased due to its multifaceted effects in enriching teaching-learning content and changing the patterns of teaching from teacher-centric to student-focused teaching (Li & Ni, 2011). Moreover, technology use has been found associated with enhancing the interest of students in learning as well as their communication skills and improving the overall efficiency of teaching-learning activities. This suggests the role that the integration of technology can play in improving the teaching skills of teachers and supporting their professional development.

However, the use of technology brings with it anxiety and pressure among the teachers due to reasons of learning new skills, integrating it with traditional teaching practices, and ensuring completion of the syllabus in the stipulated timeframe (Liu & Onwuegbuzie, 2014). Sometimes, they might not have the necessary technical support in their institutions in times of need which may further influence their attitudes and approach towards using technology. This issue may particularly become more challenging to confront among teachers in rural schools in China. This is because teachers in rural areas already are facing problems associated with job isolation, resource shortage, and lack of sufficient training that could improve their teaching competencies (Abbey et al., 2022). However, technology use could also be a boon for rural teachers who could use it to connect with the outside world, get adequately trained and become professionally competent, provided they are given adequate resource support (Hennessy et al., 2022). It is therefore critical to investigate how rural school teachers in China perceive the use of technology concerning their professional development. The present study is taken to

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understand the relationship between perceived technology use and the professional development of rural school teachers in China.

Consequently, three objectives were framed to achieve this aim.

*RO1*. To study the patterns of technology use and professional development of rural school teachers in China.

*RO2*. To explore the gender differences in the patterns of technology use and professional development of rural school teachers in China.

*RO3*. To analyse the relationship between technology use and professional development of rural school teachers in China.

*RO4*. To examine the effect of technology use on the professional development of rural school teachers in China.

In alignment with these objectives, three research hypotheses were designed.

*H01*. There are no statistically significant gender differences in the patterns of technology use and professional development of rural school teachers in China.

*H02*. There is no statistically significant relationship between technology use and professional development of rural school teachers in China.

*H03*. There is no statistically significant effect of technology use on the professional development of rural school teachers in China.

## METHODOLOGY

### Research Design

The present study aimed to quantitatively explore how rural school teachers in China perceive the use of technology concerning their professional development, in a single timeframe. Consequently, the study utilised a quantitative cross-sectional research design to collect quantitative data from the participants at a single point in time using quantitative survey questionnaires. Since data is collected only at one time, cross-sectional research is time, resource, and effort-efficient (Wang & Cheng, 2020). Additionally, it can be used to collect larger data in relatively smaller times, as is the need of this research. Therefore, cross-sectional design was the most appropriate choice for the research design of this study. The independent variable of the study was 'technology use' and the dependent variable was the professional development of rural school teachers in China.

### Participants

The sample of the study was determined in a phased manner proceeding from determination of population and sampling frame to sample. The population of the study comprised school teachers teaching in rural schools in China. The inclusion criteria of the study were being a teacher in a rural school in China at any level of teaching, i.e., pre-primary, primary, or secondary. For the sampling frame, a list of rural schools in the Sichuan province of China was drawn out and principals of those schools were contacted through mail correspondence to seek permission from them for the study. The principals of these schools were briefed about the purpose of the research, how the data would be collected, and how the responses obtained from the teachers would be used. Once the principals had permitted to carry out the study on the teachers in their schools, an email describing the purpose of the study and an informed consent form were shared with the teachers of the schools. Those teachers who voluntarily agreed to become part of the study by filling out the consent forms were inducted into this research. In this manner, the sampling method of the study was convenience sampling method. The teachers who filled out the informed consent form were then shared with the combined survey questionnaire to fill out. The first 200 teachers (100 males and 100 females) who filled out the questionnaire were selected as the final sample of the study. Thus, the final sample of the study comprised 100 female and 100 male conveniently selected teachers who completed the questionnaire.

## Research Instruments

Online survey questionnaires were employed to measure the technology use and professional development of Chinese rural school teachers. For 'technology use,' a survey-based questionnaire was self-constructed as there was no appropriate and standardised tool for assessing the use of technology in the Chinese context. The process of scale construction began with identifying and reviewing the existing tools for technology use. The tool most relatable to the context of the study was the '*Educational Technology Standards Scale'* of Naci Çoklar and Ferhan Odabaşı (2009); however, it could not be used in the study since it was not standardised in the Chinese context. The items of this scale along with other scales were analysed and a preliminary draft of 20 items was prepared. This draft was then reviewed by experts and peers, its content validity was computed, it was piloted on a smaller sample of 30 teachers, and its reliability was calculated; in this process, four items were removed from the preliminary draft. Thus, the final scale had 16 items rated on a five-point Likert scale of 1 (never) to 5 (always). As all the items are positively scored, the range of scores possible for this scale is 16-80. The content validity indices for items ranged between 0.80 to 1.00, and the content validity index of the overall scale was 0.76, which indicates high content validity. The reliability of the scale was calculated using the test-retest method, and Cronbach's alpha value for the scale was found to be 0.83. Thus, it can be asserted that the scale had high validity and reliability and was an appropriate measure for assessing the 'technology use' of school teachers in China.

Similarly, for 'professional development', there was no appropriate tool in the Chinese context that could be applied to rural school teachers. Therefore, a five-point Likert scale of 1 (never) to 5 (always) was self-constructed which had 15 positively-scored items. The scale construction process used was the same as the one used for constructing the 'technology use scale'. The range of scores possible for the 'Professional Development Scale' was 15-75. This scale had an ICVI range of 0.8 to 1.00 and an SCVI value of 0.81. The reliability coefficient value for the scale was 0.88, making it a highly reliable scale. Due to items set in the context of Chinese rural schools and high reliability and validity, the scale was appropriate for assessing the professional development of rural school teachers in China. When the two scales had been constructed, they were combined with the demographic information of the participants to design a comprehensive survey tool on 'Questionnaire Star,' the link to which was later shared on social media platforms through the advertisement.

## Procedure

The study began with the construction of the two questionnaires, the 'technology use scale' and the 'professional development scale.' Once the scales had been constructed, the participants were recruited by contacting the principals of the schools, and after obtaining their permission, the link to the survey questionnaires was shared with the teachers of the schools. The link to the questionnaire had a participant information sheet which had all the information about the research ranging from its purpose to means of data collection and how that data ought to be used to acquaint the interested individuals with what the study concerns. This participant information was aimed at making sure that individuals make an informed decision about taking part in the study. Along with this, the link also had a consent form which the participants needed to sign before beginning with filling out the survey, and the combined survey questionnaire seeking demographic information and perception of the participants regarding their technology use and their professional development. When the participants had filled out the consent form, they were directed to the questionnaire, which took approximately 20 minutes. When 200 teachers (100 male teachers and 100 female teachers) had filled out the questionnaires, the link to the survey questionnaire was disabled and no new data was collected. The raw data was compiled together in MS Excel distinctively for male and female teachers for ease of analysis. This data was then exported to IBM SPSS where data was analysed by computing descriptive and inferential statistics.

## Data Analysis

As the data is collected through quantitative survey questionnaires, the data is quantitative in nature. This data was analysed using MS Excel and IBM SPSS by computing both descriptive and inferential statistics. The descriptive statistics comprised mean, percentages, and standard deviation, which were used to analyse the

patterns in technology use and professional development of teachers in rural schools in China. To understand the differences in technology use and professional development of male and female teachers from rural schools in China, a t-test will be computed. Lastly, to explore the relationship between the two variables, inferential statistics like correlation and regression analyses were carried out.

## Ethical Considerations

The research has followed appropriate measures for ensuring ethical standards at all stages from recruitment of participants to data analysis and reporting. Principals of the schools from which teachers were recruited were informed before ensuring they were well-informed and comfortable with their teachers being selected as the participants of the study. Teachers were also provided detailed information about the research objectives, the nature of data being collected, and how it will be used to ensure they made a well-informed decision. A convenience sampling for selecting participants through the sharing of research information with the teachers ensured that interested teachers voluntarily participated in the study without any coercion. The survey questionnaire for collecting data did not seek any personally identifiable information about the teachers, making sure that their confidentiality and privacy were maintained; additionally, they were given the freedom to leave the survey at any time they felt uncomfortable. The collected data in both raw and analysed forms was kept safe in encrypted folders on the researcher's laptop and was accessible only to the research team. All these measures ensured ethics in conducting the present study.

# RESULTS

## Descriptive Statistics

The first objective of this study was to study the patterns of technology use and professional development of rural school teachers in China. For this, descriptive statistics including mean and standard deviations of participant scores on technology use and professional development were calculated (Table 1).

**Table 1 Descriptive Statistics for Technology Use and Professional Development**

| Measures | *Mean* | *Std. Deviation* | *n* |
|---|---|---|---|
| Technology Use | 48.30 | 9.21 | 200 |
| Professional Development | 40.84 | 6.08 | 200 |

Technology Use of rural school teachers in China was rated on a 5-point scale of 16 items. The maximum score possible on this scale was 80 and the minimum was 16. Based on this range, three levels of technology use were identified: low technology use (scores of 20 and less), average technology use (scores between 21 and 40), and high technology use (scores above 40). The mean technology use of sample rural school teachers in China was found to lie in the high range, as $M = 48.30$, $S.D. = 9.21$. This means that rural school teachers in China are using technology to a high degree in their classrooms during teaching-learning activities. It is further noted that these teachers are using technology for activities ranging from maintaining attendance to making lessons interactive and personalised, creating innovative digital content, parent-teacher meetings, and keeping track of the progress of students through diverse digital data analysis software.

Professional development of the rural school teachers in China was also rated on a 5-point scale comprising 15 positively-scored items. The maximum possible score on this scale was 75 and the minimum was 15. Three levels of professional development perceived by the teachers were identified: low professional development (scores of 18 and less), average professional development (scores between 19 and 56), and high professional development (scores above 57). The mean value of professional development obtained from the sample was observed to lie in the average range, as $M = 40.84$, $S.D. = 6.08$. It means that the sample rural teachers feel their professional development is occurring at an average pace concerning their leadership roles, participation in networking and training programs, and efficient incorporation of feedback from students, colleagues, and administration. Thus, it can be concluded that rural school teachers in China report high technology use and average professional development.

## Gender-wise Analysis

The second objective of the current study was to explore the gender differences in the patterns of technology use and professional development of rural school teachers in China. To fulfil this objective, a t-test analysis was done between the scores of male and female rural school teachers in China to ascertain if the males and females significantly differed in their technology use and perception of professional development (Table 2).

**Table 2 Gender-wise Comparison of Technology Use and Professional Development**

| | *Gender* | *N* | *Mean* | *S.D.* | *t-value* | *p-value* |
|---|---|---|---|---|---|---|
| Technology Use | Male | 100 | 56.38 | 4.72 | 25.94 | .000* |
| | Female | 100 | 40.22 | 4.06 | | |
| Professional Development | Male | 100 | 43.86 | 5.34 | 8.06 | .000* |
| | Female | 100 | 37.83 | 5.23 | | |

*Note.* * $p < .01$

For technology use, the mean value of male teachers ($M = 56.38$, $S.D. = 4.72$) was considerably higher than that of female teachers ($M = 40.22$, $S.D. = 4.06$). This mean difference was found to be statistically significant at a .01 level of significance as reported by the t-value, $t\ (198) = 25.94$, $p < .001$. This suggests that male rural school teachers in China are using more technology compared to female rural school teachers for carrying out their teaching pursuits. For professional development also, the mean value of male teachers ($M = 43.86$, $S.D. = 5.34$) was considerably higher than that of female teachers ($M = 37.83$, $S.D. = 5.23$). This mean difference was found to be statistically significant at a .01 level of significance as reported by the t-value, $t\ (198) = 8.06$, $p < .001$. This suggests that male rural school teachers in China perceive themselves to be developing more on the professional front as compared to female rural school teachers. Thus, the hypothesis, *H01* 'There are no statistically significant gender differences in the patterns of technology use and professional development of rural school teachers in China' is rejected. Conclusively, it can be stated that statistically significant gender differences exist in technology use and professional development of rural school teachers in China.

## Correlational Analysis

The third objective of this study was to analyse the relationship between technology use and the professional development of rural school teachers in China. To fulfil this objective, a correlational analysis was done and a Pearson's correlation coefficient was calculated (Table 3).

**Table 3 Correlation Coefficient (r) of Technology Use with Professional Development**

| Measures | *r* | *df* | *p* |
|---|---|---|---|
| Technology Use * Professional Development | .45 | 198 | .000* |

*Note.* * $p < .01$

Technology use was observed to be statistically significantly correlated with the professional development of rural school teachers, $r\ (198) = .45$, $p < .001$. The value of the correlation coefficient indicates a strong positive correlation between technology use with professional development. It means that change in the use of technology by rural school teachers will bring about significant direct change in their professional development. In other words, an increase in the use of technology by rural school teachers in China will bring about an increase in their professional development and vice versa. Thus, the hypothesis, *HO2* 'There is no statistically significant relationship between technology use and professional development of rural school teachers in Chin' is rejected. It can, therefore, be concluded that technology use is significantly correlated with the professional development of rural school teachers in China.

## Regression Analysis

The last objective of the present study was to examine the effect of technology use on the professional development of rural school teachers in China. Regression analysis was conducted to fulfil this objective (Table 4).

**Table 4 Regression Analysis of Technology Use with Professional Development**

| | ***B*** | ***Std. Error*** | ***Beta*** | ***T*** | ***Sig.*** | ***R²*** | ***F*** | ***p*** |
|---|---|---|---|---|---|---|---|---|
| **(Constant)** | 26.59 | 2.06 | | 12.89 | .000 | .20 | 49.50 | .000 |
| **Technology Use** | .29 | .04 | .45 | 7.04 | .000 | | | |
| ***Note: p < .01*** | | | | | | | | |

For the regression model between technology use and professional development of the Chinese rural school teachers, the regression coefficient, $B$ = .58, was statistically significant. It indicates that a unit change in technology used by Chinese rural school teachers will bring .29 units of change in their perceived professional development. A positive sign of regression coefficient signifies that every unit increase in technology use will increase the perceived professional development of Chinese rural school teachers, and vice versa. The beta value, suggesting the degree of relationship of technology use with professional development, is $r$ (198) = .45, $p$ < .05, which suggests towards a moderate to highly strong relationship. A high beta value also demonstrates that there are underlying factors causing this relationship, and it is not a random coincidence.

The F value, $F$ (1, 198) = 49.50, $p$ <.001 indicates the significantly high predictability of technology use for the professional development of Chinese rural school teachers. Additionally, the $R^2$ value of .20 implies that the use of technology by Chinese rural school teachers can predict 20% variability or changes in their perception of professional development. Conclusively, it can be asserted that the professional development of rural school teachers in China is significantly affected and predicted by the degree of their use of technology. Therefore, the hypothesis, *H03* 'There is no statistically significant effect of technology use on professional development of rural school teachers in China' is rejected.

## DISCUSSION

The current research was designed to investigate the role of technology use in the professional development of Chinese rural school teachers with the help of quantitative data. The findings have demonstrated that rural school teachers in China are using technology to a high degree in their classrooms during teaching-learning activities. The use of technology by these teachers is observed for activities ranging from maintaining attendance to making lessons interactive and personalised, creating innovative digital content, parent-teacher meetings, and keeping track of the progress of students through diverse digital data analysis software. Additionally, it was noted that rural teachers feel their professional development is occurring at an average pace concerning their leadership roles, participation in networking and training programs, and efficient incorporation of feedback from students, colleagues, and administration.

Furthermore, it was found that there were statistically significant gender differences in technology use and professional development of rural school teachers in China. Male rural school teachers were found to more technology compared to female rural school teachers for carrying out their teaching pursuits. This finding aligns with the contemporary research in the field of education and technology use which has found that gender along with other factors may influence the perception, uptake, and use of technologies in the workplace (Liu et al., 2015; Teo et al., 2018). This trend may be compounded by other factors affecting teachers in a school in rural areas such as the availability of resources, technical assistance and support, and appropriate exposure to technologies in the learning and training phases of young teachers (Lu et al., 2023). As unearthed in concurrent research, female students in China report lesser access to technological resources during their schooling and college years which may impact their confidence and self-efficacy concerning technology use (Cai et al., 2017; Šabić et al., 2022). In the absence of adequate training, when these female students become teachers, they may

carry their perception to their workplace and may remain reluctant to use much technology in their classrooms.

For professional development also, male rural school teachers in China were found to perceive themselves to be developing more on the professional front as compared to female rural school teachers. This result aligns with the typical career trajectories and development aspects of the female workforce in other domains. Since historical times, males have been given more opportunities to go out, learn new skills, and seek new technologies (Šabić et al., 2022). On the other hand, females, on a large scale, have started to get exposure to such opportunities, skills, and technologies only in recent history. This seems to have fostered a sense of gender disparity in how both genders perceive opportunities, skills, and technologies oriented towards their professional development (Liu et al., 2015). For instance, male teachers who have better exposure to opportunities and technologies may become more adept and proficient in utilising them, which can be seen reflected in their motivation to use more technological tools in their teaching practices in classrooms. Moreover, societal stereotypes in which males are considered to be more skilled and proficient in the use of technologies than females may also have an impact on how male and female teachers unconsciously use various technologies in their classroom teaching practices (Huffman et al., 2013). This has a direct impact on the way these teachers interact with others, network with the outside world, and adapt new means to improve their professional competencies and development. Thus, it can be summarised that technology use and professional development of male and female teachers are affected by several intrinsic and extrinsic factors, and the impacts are more pronounced in rural areas where resources and opportunities for professional growth are limited.

Furthermore, technology use was found to be significantly correlated with the professional development of rural school teachers in China. The regression analysis revealed that the professional development of rural school teachers in China was significantly affected and predicted by the degree of their use of technology. It means that change in the use of technology by rural school teachers was found to bring about significant direct change in their professional development. This finding has transformative scope in the field of education where appropriate strategies and policies can ensure enhanced professional development of teachers by influencing how they use various educational technologies. The role of technology use in the professional development of teachers has previously been supported by scholars like (Shin et al., 2014) who asserted that along with being an educational tool, technology also catalyses the pedagogical development of teachers. This is so because access and knowledge of technology use can help teachers access resources, tools, and strategies from across the world which were previously inaccessible, thus expanding the horizon and range of their teaching competencies (Li et al., 2019). These competencies may include the widening base of subject knowledge of the teachers and also the use of various creative forms of methodologies and techniques of teaching like personalised systems of instruction, flipped classrooms, or blended learning. All of these technologies can provide a new direction towards improving the classroom experiences of teachers as well as students.

In addition to improving teaching-learning experiences, the use of technology can also be useful for teachers to provide them access to the various virtual networks dedicated to teaching and professional learning with the help of educational technologies (Quinn et al., 2022). Such virtual networks and forums can be vital for teachers since with the help of these networks, teachers can share their experiences of technology use, collaborate with fellow teachers, and obtain support from them, thus transcending geographical and political boundaries (Xu & Boudouaia, 2023). Such networking is especially critical for teachers of rural areas in China who report feeling professionally isolated from the rest of the country and the world. Thus, it can be inferred that technology can act as a catalyst for bridging the divide of professional competencies among rural and urban male and female teachers in China. This will lead to the provision of equitable technological resources and opportunities to all school teachers in China, thereby promoting their professional development.

The study has several implications for stakeholders like teachers, administrators, and policy planners working in the field of rural school education. One direct and crucial implication of the study is that given the role of technology use in furthering their professional development, rural school teachers can focus on using more appropriate technologies to promote their continuous professional development. For this, teachers can participate in online training courses, workshops, seminars, and other collaborative projects from time-to-time. Moreover, teachers from rural areas frequently complain about being isolated from the rest of the developed

parts of the country (Abbey et al., 2022). Technology can be used by teachers as a means to break this barrier to networking with the outside world and further their professional development through virtual collaborations and meetings. Such collaborations can help teachers from rural areas to exchange their ideas with other teachers from developed urban areas and learn the contemporary developments in their field of teaching and their overall professional development. Though the study found an overall high technology use by the rural school teachers, it was noted that female teachers are using technology significantly less than the male teachers which is also reflected in their lower perception of professional development. For this, appropriate steps can be taken to encourage greater use of educational technology among female teachers so that they can integrate contemporary technologies into their professional practice and further their professional development.

The study holds implications for policy planners as well. As obtained in this study, technological resources are critical in the contemporary world for effective education, and given the multifaceted challenges of education in rural areas, policy planners can strive to make these resources equitably available for rural school teachers as well. For this, the government shall allocate adequate funds to the education of rural areas so that teachers in these schools also have access to contemporary technological tools to make their teaching more effective and comparable to teachers from urban schools. Moreover, policy framers can make efforts to bridge the gender-based gap observed in the technology use and professional development of Chinese rural school teachers. They can frame targeted policies and strategies that support and further the use of various technologies and technological tools by female teachers, consequently furthering their professional development. Such programs can be designed where female teachers are given training to improve their competencies related to the use of technology so that they can better integrate educational technologies into their lesson plans and overall management of classroom activities. Furthermore, school curriculum can be designed in such a manner that necessitates the integration of technology in classroom teaching-learning activities, supporting the professional development of rural teachers.

This study can be used as a base by the administrators to foster a supportive environment that acknowledges and promotes the professional development of teachers by promoting the use of technology in classrooms. This can be done through enhanced focus on networking and collaborative activities which can provide the rural teachers opportunities to share their strategies and experiences of using technology in the classrooms. Additionally, administrative staff of rural schools can support the professional development of their teachers by ensuring adequate availability of technological resources and training and technical support to use those resources. Lastly, administrative staff of schools can implement mechanisms for monitoring and evaluating the technology use by individual teachers of their schools and how that usage is impacting their professional development. By doing this, they can become aware of the strengths and weaknesses of individual teachers and can implement strategies and initiatives targeting the development of specific aspects of each teacher. Based on this discussion, it can be summarised that technology use is critical to the development of Chinese rural school teachers on the professional front. The study has further called into action teachers, administration, and policy framers to nurture an environment, supportive of technology use and promoter of professional development of rural teachers, particularly the female teachers.

## Limitations and Recommendations

The present study has expanded the understanding of how the use of technology can influence the professional development of rural teachers in China. however, there are certain aspects which limit the quality of this research. The first limitation comprises the method of sampling used in the study. The convenience sampling method was used to collect data from teachers of rural schools in a specific province of China, i.e., the Sichuan province. Due to the specificity of the region, the results may not apply to rural school teachers from other parts of the country. It may be possible that rural teachers from different parts of China may experience unique rates of access to technology and professional development governed by factors and challenges unique to those regions. To overcome this challenge, future researchers shall target selecting a randomised sample which is representative of the entire population of rural school teachers from different provinces in China, so that the results can be generalised for all rural school teachers of China.

The second limitation of this study lies in its research design. This study used a cross-sectional design, which

has helped gather valuable information on the relationship of technology use with professional development in a specific timeframe. Nevertheless, this study has not established the long-term changes that may occur in this relationship over time. To overcome this limitation, future studies shall undertake longitudinal research that will explore the changes in the use of technology and professional development as well as the long-term impact the use of technology can have on the development of rural teachers on the professional front. This study quantitatively explored the gender-based differences in the technology use and professional development of rural school teachers in China. Though significant differences among male and female teachers were observed in their professional development and use of technology, the study did not attempt to establish the causality of this relationship. This limitation can be overcome by collecting qualitative data along with quantitative data in a mixed-methods study. Methods like focus groups or semi-structured interviews can help obtain in-depth information about the challenges faced by and experiences of rural school teachers, particularly female teachers, in using technology. These methods can also shed light on the reasons for a certain degree of professional development that the rural teachers perceive to be exhibiting. Alongside, such methods could help gain insights into the personal, institutional, and social challenges that are faced by the female teachers which leads to their lower adoption of technological tools compared to the male teachers.

One limitation related to the data collection of this study is the kind of data that has been collected. The research utilised two Likert-type self-reported survey questionnaires to collect data where participants were required to affirm the degree of how closely they relate to the items assessing their professional development and their use of technology. While such data is good for making generalisations, the participants can respond in a biased manner due to self-selection or social desirability bias, affecting the credibility of the results of the study. This limitation can also be overcome with the help of mixed-methods analysis wherein the quantitative survey-based findings can be corroborated with in-depth interviews with the participants. Another limitation of data collection is that the use of technology has been used as a singular variable with no depth or dimensions that can shed light on the various aspects of technology use like instructional, recreational, or administrative and their unique effects on the professional development of Chinese rural school teachers. Future studies can distinguish various kinds of technology use and analyse their effects distinctively. Researchers in future can also explore the various educational technologies to know which ones are more effective for both the learning of the students and the professional development of the teachers. Researchers can further explore the actual availability of resources as well as opportunities for professional development in rural areas to establish synchronisation between reality and perceptions and also understand the kind of efforts needed to improve both. In summary, it can be said that this research is a very small effort in the vast domain of education. Thus, future researchers shall take steps to overcome the limitations of this study and expand the understanding of technology use in the field of teacher education and development.

## CONCLUSION

In conclusion, the focus of this study was on exploring the relationship, if any exists, between the technology use by Chinese rural school teachers and their professional development perceived by them. For this, data was collected from 200 rural school teachers in China (100 male and 100 female teachers) selected by convenience sampling. Quantitative data was collected on Likert-type scales and analysed using statistical measures. The results of the study revealed that rural school teachers in China reported a high-level use of technology in their teaching lives. Corresponding to this, their perception of professional development lied in the average range. It was further observed that there existed a significant correlation between technology use and professional development of rural school teachers in China, and technology use was a significant predictor of professional development of these teachers. Additionally, gender differences in the trends of technology use and professional development of male and female teachers were also analysed. It was noted that male teachers had significantly higher technology use and corresponding higher feelings of professional development compared to the female rural school teachers.

The study has also presented policy suggestions and implications for teachers, government and policy framers, and school administration. These suggestions pertain to how they can design and implement strategies to ensure optimal and beneficial use of technology for ascertaining professional development of teachers and improving

the overall quality of education in rural schools. The study has also highlighted certain limitations in its methodology and how they can be overcome by future researchers.

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## Appendices
## Appendix 1. Technology Use Scale: Self-constructed

This scale comprises 16 items on how the perceived use of technology by rural school teachers of China. As a rural school teacher from China, you are requested to rate the items in a range of 1 to 5 to display how closely you agree with the item.

*Item Rating*:

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

| *S. No.* | *Statements* | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|
| 1 | I have access to educational technology tools and services in my school. | | | | | |
| 2 | I regularly use technology to maintain attendance of students in my classes. | | | | | |
| 3 | I use technology to make my lesson plans more organised. | | | | | |
| 4 | I use technology such as audio-visual aids to make my lesson plans more effective. | | | | | |
| 5 | I have found and used creative and interactive technologies on the internet to make my lessons more engaging. | | | | | |
| 6 | I make use of technology to assess my students and keep a track of their progress through diverse digital data analysis software. | | | | | |
| 7 | I regularly use multimedia presentations to make my lessons more presentable. | | | | | |
| 8 | I encourage my students to learn various educational technologies to make their learning more interesting, engaging, and personalised. | | | | | |
| 9 | I encourage my students to play interactive educational games. | | | | | |
| 10 | I encourage my students to create innovative digital content. | | | | | |
| 11 | To understand the changing needs of my students, I arrange for digital surveys from time-to-time. | | | | | |
| 12 | To adapt to the changing learning needs of my students, I adopt personalised educational technologies. | | | | | |
| 13 | I have used digital platforms to have meetings with students and their parents from time-to-time. | | | | | |
| 14 | I am aware of and adopt ethical measures to use technology. | | | | | |
| 15 | I am confident in the use of various contemporary educational technologies. | | | | | |
| 16 | To improve my knowledge of diverse contemporary educational technologies, I keep participating in online and offline workshops and resource meets. | | | | | |

## Appendix 2. Professional Development Scale: ***Self-constructed***

This scale consists of 15 items that seek the perception of rural school teachers of China regarding the sense of professional development they feel they get in their workplace, i.e., their schools. As a rural school teacher from China, you are requested to rate the items in a range of 1 to 5 to display how closely you agree with the item.

*Item Rating*:

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

| *S. No.* | *Statements* | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|---|
| 1 | I am driven towards furthering my professional growth and development. | | | | | |
| 2 | I regularly self-assess my teaching methods and strategies to improve them. | | | | | |
| 3 | I seek professional help from my colleagues to provide me constructive feedback on my teaching. | | | | | |
| 4 | I utilise the feedback given by my students or colleagues to improve my teaching. | | | | | |
| 5 | I set specific goals for my teaching practice for every month and evaluate them at the end of the month to see my progress. | | | | | |
| 6 | I actively take part in teacher development workshops, seminars, conferences, and networks. | | | | | |
| 7 | I keep updating my knowledge in my subject area through online courses, review of research, and networking with fellow teachers. | | | | | |
| 8 | I actively take part in leadership roles to prepare myself for any future leadership opportunities. | | | | | |
| 9 | I actively seek certification courses to further my knowledge and teaching skills. | | | | | |
| 10 | I take part in seminars, workshops, and activities intended at promoting interdisciplinary knowledge. | | | | | |
| 11 | I take every opportunity to guide teacher trainees or new teachers in the school. | | | | | |
| 12 | I actively learn and utilise technological advancements to make my teaching more interactive, engaging, and effective. | | | | | |
| 13 | I cater to the sociocultural differences of my students to provide them with a more inclusive teaching-learning environment. | | | | | |
| 14 | I actively take part in community development programs. | | | | | |
| 15 | I adopt ethical teaching practices in my classrooms. | | | | | |