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Introduction to Research Methods in Education

Unveiling the Enablers of Digital Literacy Integration in Rural School

Curricula: A mixed methods Exploration

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Unveiling the Enablers of Digital Literacy Integration in Rural School Curricula: A mixed methods Exploration

1. Introduction

This research aims to investigate the predominant factors influencing the integration of digital literacy education in the rural schools in Heilongjiang, as well as the extent to which digital literacy education is a formal part of the school curriculum. The identified research question is as follows: What are the predominant factors influencing the integration of digital literacy education in the curriculum of rural schools in Heilongjiang, and to what extent is digital literacy education a formal part of the school curriculum?

Utilizing a mixed methods approach, the study entails a concurrent collection and integration of both quantitative and qualitative. The quantitative component includes structured surveys and document analysis, while the qualitative component involves in-depth interviews with key stakeholders and focus group discussions. Strengths of the mixed methods approach and ethical considerations will also be discussed in the paper.

2. The Chosen Method for Data Collection

In this research, a mixed-method including quantitative and qualitative will be employed. Mixed method designs are viewed as preferable in implementation research because they provide a better understanding of research issues than either qualitative or quantitative approaches alone (Palinkas *et al.*, 2011). In such designs, qualitative methods are used to explore and obtain depth of understanding as to the reasons for success or failure to implement evidence-based practice or to identify strategies for facilitating implementation while quantitative methods are used to test and confirm hypotheses based on an existing conceptual model and obtain breadth of understanding of predictors of successful implementation (Teddle & Tashakkori, 2003).

2.1 Quantitative Method

In this research, survey questionnaire will be utilized to gather quantitative data on the formal integration of digital literacy education in the curriculum. Questionnaires are the most frequently used method for the investigation of presence (Hein *et al.*, 2018). Questionnaire instruments have several advantages compared to other methods of investigating presence. They are cheap, easy to administer, and they are applicable regardless of the VE used (Gressini, S., and Laumann, K. 2020).

In this research, questionnaires will be designed separately for different participants, including school administrators, teachers and parents. The questionnaires cover the key areas of digital literacy education integration, its influencing factors, and provides room for teachers' opinions and suggestions. It will be conducted online or offline, depending on the preferences and accessibilities of the targeted participants. Then the collected data will be analyzed to identify the predominant factors influencing digital literacy education integration in rural schools in Heilongjiang, as well as its current status as a formal part of the school curriculum.

2.2 Qualitative Method

Interviews, focus group discussions and document analysis are employed in this section.

2.2.1 Interviews

Interviews will be conducted with teachers, school administrators, and education policymakers .

Interviews with teachers from rural schools in Heilongjiang will focus on the their training and qualifications in digital literacy, the availability of educational resources and infrastructure, and any innovative teaching methods they have employed to enhance digital literacy instruction. The purpose is to explore their experiences and challenges in integrating digital literacy education into the curriculum.

The administrators from rural schools in Heilongjiang will be interviewed. The aim is to gain insights into the administrative perspective on the integration of digital literacy education. The interviews will delve into their perceptions of the significance of digital literacy education, the challenges they encounter in implementing it, and any strategies they have put in place to facilitate its integration within the educational framework.

Staffs from the provincial or local education department in Heilongjiang will be interviewed to understand the policy perspective on the integration of digital literacy education. These interviews will examine the policies and guidelines that influence the integration of digital literacy education, the resources allocated for its implementation, and any future plans or initiatives aimed at promoting digital literacy education in rural schools.

After conducting the interviews, the data will be collected and analyzed. Some factors influencing digital literacy education integration in rural schools in Heilongjiang will emerge from the data. Once the predominant factors are identified, the information will be used to create a system design that addresses the identified factors and promotes the integration of digital literacy education into the school curriculum.

2.2.2 Focus Group Discussions

Focus group discussions will be organized with students to gain a deeper understanding of the research question. It involves the following steps: identify participants, schedule, develop an agenda, conduct discussions and prepare the report.

- a. Identifying Participants: Students from Grade 6 at rural schools in Heilongjiang will be invited to participate in the focus group discussions.

- b. **Scheduling:** A date and time that is convenient for the participants will be selected, along with a location that fosters an open and comfortable discussion environment.
- c. **Developing an Agenda:** An agenda will be created outlining the topics and questions to be discussed during the focus groups. This will include subjects such as their experiences with digital literacy education, their opinions on its importance, and any challenges they face in accessing and utilizing digital resources.
- d. **Conducting Discussions:** During the focus group discussions, participants will be encouraged to share their experiences and perspectives. Follow-up questions will be asked to gain a deeper understanding of their thoughts and feelings.
- e. **Analyzing Data:** Following the focus group discussions, the data will be analyzed to identify perspectives and ideas that emerged during the discussions. (A detailed process for the quantitative data analysis is provided in 3.2)
- f. **Preparing the Report:** A report summarizing the key findings from the focus group discussions will be prepared. This will include any themes or ideas that emerged during the discussions, as well as any recommendations for improving digital literacy education in rural schools in Heilongjiang.

The findings gained from these discussions can guide the integration of digital literacy education into school curricula and improve access to digital resources for students in rural areas.

2.2.3 Document Analysis

It is essential to analyze the document of relevant school curriculum documents and educational policies to answer the research question. It will provide insights into the current status and trends of digital literacy education in Heilongjiang rural schools.

The first step is to identify the relevant documents for review. These documents may include the latest school curriculum outlines, syllabi, teaching guidelines, and official educational policies, which can reflect the current situation.

These documents are reviewed in detail to extract information on the integration of digital literacy education in the rural school curriculum. The review will focus on the inclusion of digital literacy courses, the duration and frequency of these courses, the teaching methods employed, and any assessment or evaluation criteria used to measure student proficiency.

Through the document analysis, it will be possible to develop a comprehensive understanding of the current status of digital literacy education in rural schools in Heilongjiang. The findings will provide valuable insights into the predominant factors influencing its integration and its formal status within the school curriculum.

3. Sampling

In terms of sampling, the strategy for participant selection should be integrated into the overall logic of any study and the rationale for sample selection needs to be aligned from an ontological, epistemological and axiological perspective with the overarching aims of the study (Punch, 2004). In this research, purposive sampling will be employed as the sampling method. According to Palinkas *et al.* (2015), sampling strategies for quantitative methods used in mixed methods designs in implementation research are generally well-established and based on probability theory. While Palinkas *et al.* (2015) also stresses that purposeful sampling is widely used in qualitative research for the identification and selection of information-rich cases related to the phenomenon of interest.

According to Voxco Research (2024), purposive sampling, also known as judgment or selective sampling, is a research methodology where researchers deliberately choose participants based on their own judgment and criteria. Purposive sampling is 'used to select respondents that are most likely to yield appropriate and useful information' (Kelly, 2010, p. 317) and is a way of identifying and selecting cases that will use limited research resources effectively (Palinkas *et al.*, 2015).

Hassan (2024) also discusses that purposive sampling can be used in education research to select participants who have specific educational experiences or backgrounds. For example, researchers might use maximum variation sampling to select a diverse group of students who have experienced different teaching styles or classroom environments.

Purposive sampling can select the most representative sample based on the research purpose, thereby reducing ineffective information collection. Compared to large-scale random sampling, purposive sampling can use resources more centrally, improve research efficiency, and allow researchers to delve deeper into specific problems and collect more detailed information.

Given the advantages of purposive sampling discussed above and careful considerations on the research topic, the researcher chose it as the research sampling method.

Firstly, the purpose of this study is to study the main factors affecting the integration of digital literacy education in rural school curricula in Heilongjiang Province, and to what extent digital literacy education has become a formal component of school curricula. In the context of rural schools, the situation may vary for each school and there may be multiple influencing factors. Purposive sampling allows researchers to select participants who are most relevant to their research question or objectives, ensuring that the data collected is of high quality and useful for the research, thereby improving the efficiency and accuracy of the study.

Secondly, in rural schools, the integration of digital literacy education may face various special situations, such as insufficient facilities and inadequate teacher training. In situations where resources are limited, purposive sampling can help researchers concentrate resources and prioritize investigating key schools or regions that have a significant impact on the research question, as it allows researchers to select participants based on specific criteria, rather than randomly selecting a large number of participants. This can save time and resources.

Thirdly, purposive sampling allows researchers to delve deeper into specific issues. This study not only focuses on whether digital literacy education is included in the curriculum, but also on

the main factors that affect its integration. Purposive sampling, through targeted sample selection, can collect more detailed information about these factors and impacts.

Despite its wide use, there are numerous challenges in identifying and applying the appropriate purposeful sampling strategy in any study (Palinkas *et al.*, 2015). According to Hassan (2024), there are also disadvantages to purposive samplings, including:

Sampling bias: Purposive sampling is susceptible to sampling bias, as the participants are not randomly selected from the population. This means that the sample may not be representative of the larger population, and the findings may not be generalizable to other populations.

Limited generalizability: The findings obtained from purposive sampling may be limited in their generalizability due to the small sample size and the specific selection criteria used. Therefore, it may not be possible to make broad generalizations based on the findings of a purposive sample.

Lack of transparency: The selection criteria used in purposive sampling may not be transparent, and this can limit the ability of other researchers to replicate the study.

Reliance on researcher judgment: Purposive sampling relies on the researcher's judgment to select participants based on specific criteria, which can introduce bias into the selection process.

Potential for researcher subjectivity: The researcher's subjectivity and bias may influence the selection process and the interpretation of the data collected.

Therefore, when selecting purposive sampling to conduct the research, the researcher need to weigh these factors to ensure the accuracy and validity of the research results.

4. Data Analysis

Data analysis will be separately discussed in quantitative data analysis and qualitative data analysis.

4.1 Quantitative Data Analysis

Quantitative data analysis will follow the following steps to quantify the degree of integration in digital literacy education and identify the main factors influencing its inclusion.

- a. Collect any available official documents or reports that provide information on digital literacy education in these schools after the survey.
- b. Review the collected data to find any missing, incomplete, or incorrect information, and ensure the reliability and validity of the data. Ensure that the format and encoding of the data are consistent.
- c. Analyze the survey responses using statistical software (e.g., SPSS, R) to identify patterns and trends in the data. Calculate descriptive statistics such as frequencies, percentages, means, and standard deviations to summarize the data. Perform inferential statistics (e.g., chi-square test, t-test, ANOVA) to identify significant relationships and differences between variables. Identify predominant factors influencing the integration of digital literacy education by analyzing which factors are most strongly associated with its formal integration.
- d. Interpret the results of the statistical analysis to draw conclusions about the extent of digital literacy education's formal integration in rural schools in Heilongjiang. Identify predominant factors that are associated with formal integration of digital literacy education into the curriculum.
- e. Prepare a written report that summarizes the findings of the quantitative data analysis, highlights key patterns and trends, and provides practical recommendations based on the results. The report should include tables, figures, and appropriate statistical tests to support the analysis and conclusions.

4.2 Qualitative Data Analysis

For the qualitative data analysis, a thematic analysis approach will be used to analyze interview transcripts. The thematic analysis will help me identify key themes and patterns in the

qualitative data that can supplement and enrich the quantitative findings. It will also help in understanding the nuanced factors influencing the integration of digital literacy education. The analysis will involve:

- a. Read through all the qualitative data (survey responses, interview transcripts) to familiarize yourself with the content. Create a coding scheme that includes broad themes and sub-themes relevant to digital literacy education in rural schools.
- b. Assign codes to segments of text that capture the essence of each theme or sub-theme. Use the coding scheme developed in step 1. Ensure that each piece of text is coded under only one theme or sub-theme for clarity and consistency.
- c. Examine the coded data to identify patterns, themes, and commonalities across different sources of qualitative data. Use a thematic analysis software (e.g., NVivo) to organize and analyze the coded data more efficiently.
- d. Draw conclusions about the key themes and patterns that emerged from the qualitative data analysis. Consider how these themes complement or extend the findings from the quantitative analysis.

5. Strengths and Limitations of the Mixed Methods

5.1 Strengths

The mixed methods approach combines both quantitative and qualitative data collection methods, providing a comprehensive understanding of the research question. Quantitative data, collected through surveys and document analysis, quantifies the extent of digital literacy education's formal integration, while qualitative data, obtained through interviews and focus group discussions, provides insights into the factors influencing its integration. By integrating both types of data, the study gains a holistic understanding of digital literacy education integration.

The use of multiple data sources in this study allows for data triangulation, a technique that validates findings and enhances the overall credibility of the research. Quantitative data collected through surveys and document analysis is triangulated with qualitative data obtained through interviews and focus group discussions. This triangulation allows for cross-validation of findings, providing a more robust understanding of the research question.

The mixed methods approach allows for a deeper understanding of the context surrounding digital literacy education integration. By including teachers, school administrators, education policymakers, and students in the data collection process, the study gains an appreciation for the varying perspectives and experiences within the education system. This situational understanding is crucial in developing effective strategies and policies to improve digital literacy education integration.

Qualitative data collection methods such as interviews and focus group discussions provide in-depth insights into the factors influencing digital literacy education integration. These methods allow researchers to capture participants' lived experiences and understand the nuances of digital literacy education integration, providing valuable information for improving educational programs and policies.

5.2 Limitations:

The mixed-method for data collection has several strengths, however, it also has some potential weaknesses, including time consuming and resource-intensive.

Collecting and analyzing both quantitative and qualitative data can be time-consuming. Quantitative data collection through surveys and document analysis may require significant time to develop and distribute the questionnaire, collect responses, and analyze the data. Qualitative data collection through interviews and focus group discussions can also be time-consuming, as it involves scheduling interviews, facilitating discussions, and transcribing the data for analysis.

The need for varied data collection methods may require more resources and expertise.

Collecting both quantitative and qualitative data requires different tools and techniques, which may necessitate a team with a range of expertise. Additionally, some methods of data collection, such as interviews and focus groups, may require a substantial investment of financial resources, particularly if you are conducting the research at multiple sites or with a large sample size.

6. Ethical Considerations

With regard to the ethical issues surrounding the research process, it is essential to consider the potential impact on the participants. In this case, the students, teachers and communities involved in the integration of digital literacy education are the primary stakeholders. Ensuring that their rights are respected throughout the research process is paramount. This includes obtaining informed consent, ensuring confidentiality and anonymity of data, and minimizing any discomfort caused by the research.

Prior to conducting the research, ensuring that students, teachers, and communities provide informed consent to participate in the study is essential. This includes providing clear information about the purpose of the study and how their data will be used.

Participants may be concerned about the transfer and storage of their personal data, particularly in digital formats. Protecting the privacy of participants by ensuring that their data is kept confidential and anonymous when reporting findings.

Participants may experience emotional distress when discussing challenges and barriers related to digital literacy education in their schools, especially if they feel disillusioned or frustrated with the current state of digital literacy integration. If any emotional distress caused by the survey questionnaire, interview or focus group discussion, participants can withdraw without any consequence.

Due to the data collection of this study involving students aged under 16. Before minors participate in the questionnaire survey, the researcher will provide a Consent Form for guardians to ensure that they are clearly aware of and agree to the participation of minors.

This consent form includes the purpose and content of the investigation, which explains the purpose, content, and expected results of the investigation, and helps guardians understand the investigation that their children will participate in. Voluntary participation emphasizes that participation is voluntary, and the guardian has the right to decide whether to agree to the child's participation. Confidentiality and privacy, explaining how survey data will be used and ensuring the confidentiality and privacy protection of children's personal information. Risks and benefits, explain the potential risks and benefits of participation, and explain how to ensure that the information provided is beneficial to society while taking measures to ensure the safety of children. And contact information: Provide the contact information of the person in charge of the investigation, so that the guardian can communicate or consult when needed.

The guardian's signing of the consent form means that they understand and agree to the child's participation in the investigation, and agree to be responsible for the relevant matters during the investigation process. This is to ensure the legality, morality, and protection of minors when participating in investigations.

Furthermore, it is crucial to consider the broader social and cultural implications of digital literacy education in rural areas. Implementing sweeping changes in education without considering the unique context and needs of these communities could have unintended consequences. Therefore, ethical considerations should guide the integration process to ensure it aligns with the values and objectives of the community, respect the cultural norms, values, and practices of the rural communities involved in the study and considering their perspectives in the research process. Ensuring the research aims to benefit the participating communities and

contribute positively to the improvement of digital literacy education in rural schools should also be considered.

The integration of digital literacy education in the curriculum of rural schools in Heilongjiang faces numerous challenges and ethical considerations that need to be carefully addressed. By considering these aspects, the research process can maintain ethical standards, produce robust findings, and provide valuable insights into the integration of digital literacy education in rural schools in Heilongjiang.

7. Conclusion

The chosen mixed methods approach for investigating the factors influencing the integration of digital literacy education in the curriculum of rural schools in Heilongjiang can provide a comprehensive understanding of the research question. The concurrent collection and integration of quantitative and qualitative data allow for a more holistic exploration of this complex issue and enable a more comprehensive and nuanced understanding of the research question.

However, it is important to critically reflect on the resource-intensive nature of the mixed methods approach, as well as the challenges of integrating and analyzing diverse types of data. Ethically, the study prioritize informed consent, confidentiality, and participant autonomy, ensuring that ethical considerations are central to the research process.

Overall, the chosen mixed methods approach will prove to be a valuable and insightful means of investigating the research question, offering a holistic perspective that aligns with the multifaceted nature of the inquiry.

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