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# INVESTIGATING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) USAGE IN AL-ULA SCHOOLS

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**ABSTRACT:** *The paper outlines the research methods for investigating the implementation of Information and Communication Technology (ICT) in the Al-Ula school district of Saudi Arabia. Research questions focused on investigating the perceptions and experiences of teachers and principals in Al-Ula schools in order to gain insight into both the challenges they have faced and the successes they have experienced as they implemented technology. Purposeful sampling was used to recruit teachers and principals from 18 Al-Ula schools to participate in the study. The researcher used two collection instruments: a survey and an interview protocol. The primary function of the online survey was to provide descriptive statistics that helped to contextualize and augment the interview data. While the interview data provided more in-depth insight into the perceptions and experiences of individual teachers and principals, the survey items allowed for a quantitative view of teachers' and principals' perceptions and experiences pertaining to technology use.*

**KEYWORDS:** Information and communication technology (ICT), education in Saudi Arabia, qualitative research, quantitative research, Al-Ula school district.

## INTRODUCTION

### Overview of Design

This chapter reviews the methods that the researcher used to collect data, which focused on three research questions:

1. In what ways do teachers use or not use technology in Al-Ula schools?
2. What do teachers and principals identify as the challenges to implementing educational technology in Al-Ula schools?
3. What are teachers' and principals' recommendations to these challenges?

The primary purpose of these questions was to investigate the perceptions and experiences of teachers and principals in Al-Ula schools in order to gain insight into both the challenges they have faced and the successes they have experienced as they implemented technology. With this knowledge in mind, this study may produce recommendations to schools on how to overcome challenges and support successful practices. The methodology used in this study was designed with these questions in mind. To collect meaningful and reliable data, this researcher used two collection instruments: a survey and an interview protocol. Using both tools, the researcher was able to compare and triangulate data to develop conclusions through analysis of the data. This data

was analyzed to find common themes and trends related to the research questions. At the conclusion of the study, the researcher used the data to make recommendations about how ICT integration in Saudi Arabian schools might be improved.

**Qualitative Methods**

For this study, the researcher employed qualitative research methodology, focusing on the experiences of participants in a context-specific setting (Ponterotto, 2005). A qualitative design was appropriate for this study, as the research questions focused on the meaning that participants ascribe to their experiences with technology in Al-Ula schools. Because qualitative studies are context-specific, they take place within an environment where the participants experience the phenomenon under investigation, as opposed to a lab setting where the researcher performs a controlled experiment. For this reason, the researcher conducted this study at Al-Ula schools, drawing data from teachers and principals.

The researcher occupies a distinct role in qualitative research, personally observing participant behavior and interpreting data. Because of the more subjective stance that the researcher took in this study, he reflexively considered his position in relation to the study and the participants, maintaining an awareness of how his perspective might influence his interpretation of the data. In the data analysis phase, qualitative researchers typically follow an inductive approach, seeking patterns and developing themes from the data with the eventual goal of drawing general conclusions from it (Thomas, 2006). With these principles in mind, a qualitative approach is appropriate for a study that seeks to understand how teachers use technology in Al-Ula schools. The central research question is open-ended and does not predict a particular answer or desired result. Instead, the question is best answered by a study through which a researcher can collect data and analyze it inductively, looking for patterns and themes in the meanings that participants ascribe to their experiences.

**Population and Design**

The population for this study was selected from the Al-Ula school district, which is located in the Medina Region in northwestern Saudi Arabia. There are 133 schools in the district segregated by gender, as noted in Table 3.1.

**Table 3.1**
***School Count by Gender in the Al-Ula School District***

| Gender | Primary Schools | Middle Schools | Secondary Schools |
|---|---|---|---|
| Boys' schools | 33 | 19 | 12 |
| Girls' schools | 33 | 19 | 17 |
| Total | 66 | 38 | 29 |

Within these schools, both genders are represented among the teaching staff; however, there were more females employed within the school district than males, as noted in Table 3.2.

**Table 3.2**
***Teaching Staff by Gender in the Al-Ula School District***

| | Primary Schools | Middle Schools | Secondary Schools |
|---|---|---|---|
| Male Teachers | 275 | 156 | 73 |
| Female Teachers | 410 | 164 | 85 |
| Total | 685 | 320 | 158 |

**Sampling**

The study was selected using a purposeful sample of schools serving urban males in the Al-Ula school district in Saudi Arabia. Purposeful sampling was selected to ensure that the research was able to capture the thoughts and experiences of educators within Saudi Arabia who had experienced, would experience, or may be reluctant to experience the implementation of ICT. Palinkas et al. (2015) described purposeful sampling as a viable strategy in data collection for research, noting that "purposeful sampling is widely used in qualitative research for the identification and selection of information-rich cases related to the phenomenon of interest" (p. 1). This sampling strategy targets data-rich participants who will be able to provide data that will inform the research questions in the later chapters. In order to be selected for this study, schools needed meet a few criteria: they needed to be K-12 schools, they needed to be located in the Al-Ula school district, and they needed to have internet access and computers that could be used for instructional purposes. This study sampled only individuals from urban male schools in the Al-Ula school district. This choice was appropriate for this study, considering the culturally conservative leanings of the area. With a male researcher collecting data, the conservative culture would have made collecting quality interview data from female participants more difficult. Within these schools, there were 18 principals and 185 teachers.

**Table 3.3**
***Sampled Schools in the Al-Ula School District***

| Primary Schools | Middle Schools | Secondary Schools | |
|---|---|---|---|
| Boys' schools | 9 | 5 | 4 |

**School Selection**

The 18 schools sampled for this study included only boys' schools from the Al-Ula school district: 9 primary schools, 5 middle schools, and 4 secondary schools (see Table 3.3). These schools were selected, in part, because of the researcher's access to them. The researcher was an ICT teacher with knowledge of the existing ICT problems. In addition to personal experience, the researcher had communication with teachers and some parents who also elaborated on the ICT problems within these schools. All schools selected for the study have internet access for their teachers and each location has similar availability of their ICT components, allowing the study to have a focused examination of the same ICT experiences.

**Participant Selection**

After receiving approval from the Institutional Review Board in November 2019, the researcher contacted administrative assistants within the Al-Ula district to recruit their assistance in sending survey links. These assistants then emailed urban male teachers and principals through their listserv, explaining the study and its significance to the district and encouraging them to participate in the study. This email included information about the study as well as informed consent information and the questionnaire link (URL). All participants were asked to read the informed consent and check a box indicating their consent at the beginning of the survey.

The researcher used the snowballing sample method, which was appropriate as the researcher was an ICT teacher. The researcher used snowball sampling because of the researcher's background as an ICT teacher and his connection to teachers and principals in these schools. Etikan, Alkassim, and Abubakar (2016) noted that the snowball sampling process can be described as follows: "This initial subject serves as 'seeds,' through which wave 1 subject is recruited; wave 1 subject in turn recruit wave 2 subjects; and the sample consequently expands wave by wave like a snowball growing in size as it rolls down a hill" (p. 6). The researcher began by contacting three teachers and one principal whom the researcher knew via telephone and WhatsApp messages. The researcher scheduled time to interview them by telephone calls. The researcher then obtained informed consent and interviewed these three teachers and one principal. After the interview, the researcher asked them to refer additional teachers and principals as potential participants. These teachers and principals found other participants who agreed to participate in this study. Initial participants referred seven teachers and three principals. The second round referred three teachers and one principal. The researcher then contacted the additional participants, obtained informed consent, then interviewed them via recorded telephone calls. In order to protect participant confidentiality, the researcher assigned pseudonyms to each participant.

**Instrumentation**

This study utilized two data collection instruments: an online survey and a telephone interview protocol. These two instruments were effective methods to collect data from teachers and principals from within Al-Ula, Saudi Arabia. Mathers et al. (2007) outlined several advantages to using online surveys as a data collection instrument. They noted that surveys have a high level of external validity, as they have the capacity to capture the thoughts and beliefs of a wide range of respondents. Additionally, surveys have the capacity to cover large areas in terms of obtaining respondents from various geographic regions. Surveys have a high level of ethical advantages for the relationship between the researcher and respondent, and online surveys are flexible in the ability of the researcher to combine the collected data with data from other instruments used during the course of the research (Mathers et al., 2007).

The online survey and telephone interview protocol were adapted from "Developing a Strategic Approach to ICT Implementation in Saudi Secondary Schools"by Albugami (2016), with minor adaptations to fit the parameters of the current study. The structure of the instruments mimics the findings and areas of implementation outlined through prior research. The thematic elements within the instruments included teacher perceptions of ICT, training programs and processes, and

infrastructure and capacity elements of the ICT implementation process. Survey questions asked respondents to rate their level of proficiency with technology and to identify their experiences with its usage, their challenges with ICT implementation, their views on technology policy, and their recommendations for changes that might improve technology use. All of these elements were complemented through the discussion and assessment of teacher plans to incorporate and integrate technology in their daily lesson process and student instruction.

Semi-structured interviews allowed for potentially high-quality data collection during interactions with the respondents, as semi-structured interviews offer the researcher flexibility to clarify meaning during the interview, allowing for a variance in the questions to best fit the needs of the respondent (Barriball& While, 1994). Barriball and While (1994) stated, "The reason why the semi-structured interview is a popular data collection method is that ithas proved to be both versatile and flexible" (p. 6). The researcher compared and triangulated the respondents' interactions with the items from the survey instrument and the interview instrument. In addition to questions designed to gather basic demographic information such as age, job title, and educational attainment, interview questions were designed to address both central questions of the study, with an emphasis on open-ended questions that would elicit data-rich responses from participants. Open-ended interview questions focused on participants' technology usage, technology policy, obstacles observed in the use of technology, and recommendations for how technology can be implemented successfully. Along with the survey data, the responses to these interview questions provided valuable insight into respondents' experiences with technology implementation in Al-Ula schools.

**Pilot Study**

The researcher employed qualitative methods, as both teachers and principals completed questionnaires to provide a background of their experiences with technology and implementation of technology in their school. As part of the process of ensuring that the questionnaire was a high-quality research instrument, the researcher administered a pilot study to a small and separate population of teachers. Following the pilot study, subjects were asked to share any points of confusion or lack of clarity in the instrument. Once this process was completed, the researcher updated the instrument for the actual study. The sample size of the pilot study group was comprised of 10 teachers and 2 principals who had similar backgrounds to the participants selected to participate within the study.

**Trustworthiness**

Qualitative research "uses a naturalistic approach that seeks to understand phenomena in context-specific settings" (Golafshani, 2003, p. 600). Any research, whether quantitative, qualitative, or mixed methods, must ensure a high level of trustworthiness. The study ensured high levels of trustworthiness through several methods.

First, Chapter 3 delineates the delineates the methods and describes the underlying methodological decisions in detail to ensure that future researchers might understand the methods employed in the project and be able to replicate the procedures in future studies. The level of trustworthiness in the

study was also enhanced through the process of data triangulation. Patton (2002) noted that "triangulation strengthens a study by combining methods. This can mean using several kinds of methods or data, including using both quantitative and qualitative approaches" (p. 247). The current study was designed to combine data from questionnaires and qualitative interviews. In addition to the use of surveys, telephone interviews were conducted with teachers and principals to provide data points to triangulate the instruments used within the study. Interviews took place in a 1:1 setting; the protocol contained open-ended questions to allow for participants to have the freedom to express their answers.

To elicit more detail, the researcher employed follow-up interview questions to clarify data. To ensure the accurate collection of data, telephone interviews were also audio recorded. The final element of data collection in the interview process was the transcription of the dialogue, which allowed for accurate coding and the extraction of themes.

The use of interviews allowed the researcher to gain an in-depth perspective of the social constructs that compose the participants' reality. This notion of constructed reality is expressed in the work of Crotty (1998), who articulated "the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world and developed and transmitted within an essentially social context" (p. 42). Through a depiction of this constructed setting, interviews allowed for a vivid portrayal of the meanings behind the participants' words. These meanings are portrayed in the Results section of this study, which uses a rich textural depiction of the participants' responses to the interview items.

**Researcher's Positionality**

Researchers, being a critical component of qualitative research, naturally bring a bias to the research. This bias is addressed within the methodology work of Poggenpoel and Myburgh (2003): The researcher as instrument can be the greatest threat to trustworthiness in qualitative research if time is not spent on preparation of the field, reflexivity of the researcher, the researcher staying humble and preferring to work in teams so that triangulation and peer evaluation can take place. (p. 320).

Through the acknowledgement of researcher bias and the construction of responsive and reflexive instruments, this bias can be minimized and thus allow the true nature of the findings to come forward. This can be accomplished through the open-ended nature of interview questions and the allowance for the participants' voices to be heard. In addition to this, the researcher should address this bias in discussions in their methodology chapter, to allow the reader to better understand the role of the researcher within the research setting (Poggenpoel&Myburgh, 2003).

The researcher's positionality in this study comes from connections to the city and the educational system. The research setting was the researcher's hometown and original place of education, constituting the majority of the researcher's educational experience. This positionality has been

acknowledged to the readers of the research, so that transparency is achieved and the results of the research can thus be viewed through this context.

**Data Collection and Processing**

The researcher accomplished data collection through the use of online surveys and telephone interviews. The successful collection of data to provide valid and reliable results was paramount to the study. Several systems were established and planned to ensure that the researcher received enough data to provide a robust discussion of the findings and that recommendations could be made from the collected data points. Trustworthiness and generalizability were kept at the forefront of the research, to ensure that the data collected from the participants was of high quality and free of confounding biases caused by the researcher or other internal or external influential forces.

The following paragraphs expand upon the data collection instruments used within the study. An online survey was sent to teachers and principals by emails and WhatsApp® messages. A total of 61 surveys from teachers and 9 surveys from principals were returned. The online survey instrument allowed a larger number of respondents to be a part of the study. The online surveys were coded with unique identifiers to assist in the collection of completed surveys.

After the surveys were collected, the researcher conducted interviews with participants during four weeks. These telephone interviews lasted between 30 to 45 minutes. The researcher conducted telephone interviews with ten teachers and four principals from urban male schools in the Al-Ula district (see Table 3.4). Interview participants were selected from a directory of teachers and principals from urban male schools inthe Al-Ula district. Through personal contact with the participants, the researcher established individual appointment times that were convenient for the participants. Prior to the commencement of the telephone interviews, the researcher read informed consent to the participants, allowing each participant to review a statement of their rights as an interview participant. These rights included an acknowledgement by the participant that they understood that their participation was voluntary and that they could stop the interview at any time without fear of penalty. They were also informed that their identities would be kept confidential and that pseudonyms would be used to protect their answers and opinions. In addition to these elements, the participants acknowledged that they would not receive financial compensation for their contributions to the study. If they chose, participants could elect to receive a copy of the completed research in digital form, to help inform their practice through the review of findings and the use of recommendations made within the conclusions of the report. Additionally, participants gave permission for the researcher to audiotape the interviews.

During the telephone interviews, audio recordings were made, allowing the researcher to listen to and transcribe the responses later. This process increased accuracy and the ability of the researcher to extract meaningful context from the responses. The audio recordings were transcribed and then reviewed by the researcher in written form. The researcher identified these participants in the recordings and transcripts through pseudonyms assigned to each participant. All instruments were

translated from Arabic to English by the researcher, as he is bilingual, speaking Arabic and English.

**Table 3.4 Sample Information in Qualitative Phase**

| Name | Age | Experience in education | Participant's position | Level of teaching | Training in ICT | Subjects | ICT skills level | Qualification |
|---|---|---|---|---|---|---|---|---|
| Osama | 49 | 23 | Principal | Primary school | Moderate | Sciences | Moderate | Bachelor |
| Salem | 50 | 26 | Principal | Primary school | Moderate | Arabic Language | Moderate | Bachelor |
| Tarek | 48 | 24 | Principal | Secondary school | Moderate | Arabic Language | Moderate | Bachelor |
| Nader | 49 | 22 | Principal | Primary school | Moderate | Mathematic | Moderate | Bachelor |
| Faisal | 33 | 6 | Teacher | Middle school | Moderate | English | Moderate | Bachelor |
| Ahmad | 42 | 14 | Teacher | Middle school | Moderate | Islamic | Advanced | Bachelor |
| Ali | 33 | 6 | Teacher | Secondary school | Moderate | Physics | Advanced | Bachelor |
| Mohammed | 35 | 8 | Teacher | Middle school | Moderate | Arabic Language | Advanced | Bachelor |
| Aziz | 44 | 18 | Teacher | Primary school | Moderate | Arabic Language | Moderate | Bachelor |
| Sultan | 35 | 7 | Teacher | Middle school | Moderate | Computer | Moderate | Bachelor |
| Abboud | 33 | 7 | Teacher | Middle school | Moderate | Islamic | Moderate | Bachelor |
| Mustafa | 38 | 7 | Teacher | Secondary school | Moderate | Physics | Moderate | Bachelor |
| Hamdan | 46 | 19 | Teacher | Middle school | Moderate | Science | Moderate | Bachelor |
| Fares | 33 | 17 | Teacher | Primary school | Moderate | Arabic Language | Moderate | Bachelor |

**Data Analysis**

Data analysis included the use of data from the two research instruments: an online survey and a telephone interview. Both instruments allowed for data to be compared and triangulated to provide answers to the three research questions and for the researcher to make recommendations for future implementation and strategies surrounding the implementation of ICT within Saudi Arabia.

Burnard (1991) provided a 14-step process of analyzing interview data through an open coding process. These steps are outlined by Burnard: (a) notes are taken during the interview process; (b) transcripts and notes are read to review for possible themes from the interviews; (c) transcripts are reviewed an additional time to allow the researcher to write headings, which detail the thematic elements of the interview responses; (d) the themes are grouped under higher order headings to begin to consolidate thematic elements; (e) a new list of headings and sub-headings is created; (f) secondary readers are invited to make their own lists independent of the primary researcher; (g) transcripts are color coded to extract the themes from all copies of the reviewed transcripts; (h) sections are cut out and then pasted into a separate sheet for analysis; (i) respondents are asked to review the excerpts to check for the accuracy of the meaning; and (j) the writing process can then allow for the synthesis of meaning in the frame of answering the three research questions. The data for this research was analyzed using Burnard's model.

Once trends were identified within the interview transcripts, themes were extracted from the text and aligned with the research questions. The data was presented and triangulated against the survey data through the presentation of citations and excerpts from the participant interviews. This allowed for rich textual representation to be presented in the findings of the study. These representations were then interpreted, along with the survey data, to answer the three research questions.

The primary function of the online survey was to provide descriptive statistics that helped to contextualize and augment the interview data. While the interview data provided more in-depth insight into the perceptions and experiences of individual teachers and principals, the survey items allowed for a quantitative view of teachers' and principals' perceptions and experiences pertaining to technology use. In this way, the survey data provided an overall sense of how proficient teachers and principals are with technology, how comfortable they are with its use, and their attitudes toward technology. The survey response frequency and descriptive statistics offered another view that contributed to a clearer understanding of technology use in Al-Ula school responses in relation to the research questions. In addition, the survey items were aligned with the data collected from the interviews and could be used to highlight ways in which the views of individual participants were similar or different from the views of teachers and principals overall.

**SUMMARY**

When considering the data collection process for this study, the researcher had several key questions in mind, focusing on the ways that teachers use technology in Al-Ula schools, the challenges that teachers and principals face as they attempt to implement that technology, and the

ways they have learned to overcome those challenges. Through surveys and interviews with teachers and principals, the researcher was able to collect a rich data set that offered insight into these questions. Based on that data, Chapters 4, 5, and 6 will provide a presentation of findings as well as conclusions and recommendations for future practice.

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