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Perspectives on ICT from Inside Al-Ula Schools

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Abstract. As the following chapter demonstrates, data collected from both the online survey and a telephone interview offered valuable insights into the perspectives of teachers and principals on the use of information and communication technology (ICT) within Al-Ula schools. Interview data collected from ten teachers and four principals was coded and analyzed in order to discover themes that existed across the data set. In the following chapter, these themes will be discussed in greater detail. This chapter also contains an analysis of data drawn from surveys on technology use that were distributed to teachers. As noted in Chapter 3, the primary function of the online survey was to provide descriptive statistics that helped to contextualize the interview data. As sixty-one teachers participated in the survey, the survey data gives us a broader view of the how technology is being used in Al-Ula schools, and what some of the obstacles might be to further implementing technology within the schools. Nine principals also completed the survey, and their responses will also be referred to throughout this chapter.

Keywords. Al-Ula schools, Information and communication technology (ICT), instructional uses of ICT

Introduction

As the following chapter demonstrates, data collected from both the online survey and a telephone interview offered valuable insights into the perspectives of teachers and principals on the use of information and communication technology (ICT) within Al-Ula schools. Interview data collected from ten teachers and four principals was coded and analyzed in order to discover themes that existed across the data set. In the following chapter, these themes will be discussed in greater detail. This chapter also contains an analysis of data drawn from surveys on technology use that were distributed to teachers. As noted in Chapter 3, the primary function of the online survey was to provide descriptive statistics that helped to contextualize the interview data. As sixty-one teachers participated in the survey, the survey data gives us a broader view of the how technology is being used in Al-Ula schools, and what some of the obstacles might be to further implementing technology within the schools. Nine principals also completed the survey, and their responses will also be referred to throughout this chapter.

Through analysis of data collected from these interviews and surveys, this chapter presents findings as they pertain to three primary 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?

With those questions in mind, the analysis in this chapter focuses on the current status of technology use in Al-Ula schools and obstacles to technology use in Al-Ula schools at the time of the study. As participants were also asked about recommendations for how technology use might be improved, these recommendations will be identified in this chapter, with further discussion about recommendations for practice based on the findings in chapter five. Wherever appropriate, the findings from this study will be considered in light of both previous literature on the topic as well as *A Theoretical and Instrumental Framework for Implementing Change in ICT in Education*(Tearle, 2004).

Participant Characteristics

185 surveys were distributed to teachers, with sixty-one teachers returning the survey questionnaire. These teachers provided critical data on their processes, beliefs, and preparation for the use of technology within the classroom. The teacher respondents in the study represented a wide-ranging group of individuals with diverse backgrounds and experience. These participants belonged to a wide range of age categories:

Table 4.1
Teacher Survey Participants by Age

Under 30	30-35	36-40	41-45	46-50	51+
1.6%	32.8%	27.9%	23.0%	8.2%	6.5%

Additionally, the teachers who completed the survey represented a wide range of teaching experience:

Table 4.2
Teacher Survey Participants by Years of Experience in Teaching

1-5	6-10	11-15	16-20	21-25	26+
18.0%	31.1%	31.1%	13.1%	3.3%	3.3%

All teachers reported that they were qualified for their professional licensure through obtaining a bachelor's degree.

The teachers were asked to evaluate the time spent in their classroom on a daily basis working with ICT platforms. Based on teacher feedback through surveys, it was determined that there was significant time devoted to the use of ICT during the school day:

Table 4.3
Time Spent Using ICT in the Classroom

More than 3 hours	2-3 hours per day ay	Less than one hour per day	I don't use it
34(55.7%)	19(13.1%)	4(6.6 %)	4(6.6%)

Based on the provided data, over half of the respondents indicated that more than three hours per school day were spent with technology. In addition, the participants taught a range of school levels, with 21/61 respondents (34%) teaching at the primary school level, 25/61

(41%) at the middle school level, and 15 (25%) at the high school level. They also taught a range of subjects, with 13 teaching Arabic, 8 teaching science, 8 teaching Islamic, 7 teaching technology, 10 teaching math, 4 teaching chemistry, 8 teaching English, and 3 teaching Physics. The age, experience, teaching level, and subjects taught by teachers interviewed for this study closely resemble the teachers surveyed. The nine principals taking the survey included a broad range of experience in education, ranging from less than five to over 26 years within the field. All nine respondents indicated that their educational experience included earning bachelor's degree. In addition to this diverse perspective, principals ranged in age from under 30 to over 55 years. Principals interviewed for this study were similar in age and experience to those surveyed.

Status of Technology Use in Al-Ula Schools

A significant portion of the data provided insight into the status of ICT in Al-Ula schools as it was currently being used at the time of the study. Within this category of themes, participants highlighted the kinds of technology they had access to and their training and skill level. In addition, they discussed their attitudes toward technology use, especially in terms of their preferences for technology as a mode of instruction, and their motivations for using technology in the classroom.

Significant IT Presence in Al-Ula Schools

The data revealed that, in terms of software and hardware, ICT use and availability was prevalent in Al-Ula schools. The participants pointed out the kinds of software and hardware that they had available to them, and the different types of hardware and software appeared to be rather substantial. Hardware included computer labs, projectors and screens, smart boards, printers, and scanners. Software included internet and web browsing applications, Microsoft applications such as Word and Powerpoint, and Future Gate, which was an administrative management software. As P1 pointed out:

There are 18 computers in the lab. In addition to that, each lab is equipped with projector and smart board. There is a resource room equipped with a smart board, projector, screen. There is 1 desktop computer in the leader school room, printer, and scanner. There is a desktop computer in the assistant leader school room and printer. There is a desktop computer in the administrates rooms, a printer, and a scanner. Classrooms are equipped with a projector and a computer.

In other words, computer hardware could be found throughout the school, both in administrative offices and in classrooms. T1 also noted that, in addition to computers in classrooms, computers were also available in science labs. T1 stated that "all classrooms are equipped with a computer and projector. Of course, the equipment in the classrooms is good and used daily. There is a biology lab equipped with a computer and a projector anda chemistry lab equipped a projector." The presence of a computer and a projector in each classroom and in science labs is especially significant, as it would allow instructors to use the internet as an instructional tool, and it would allow students to give presentations using the classroom computer and screen. The teacher surveys revealed that computer labs and computers were widely available for their use, with nearly all (57/61, or 93%) teachers stating that they had frequent access to the computer lab, and over three quarters (47/63, or 77%) saying they had frequent access to a computer.

This finding offers some promise in terms of Tearle's (2004) framework for implementing change in ICT education. According to Tearle, practical factors such as availability of technology (e.g. regular access to computers at home and at school) is considered

essential to change implementation, and it appears that Al-Ula schools have at least some of that foundation in place. At the same time, it is important to note that while the technology available in the schools may have been sufficient for many purposes, both teachers and principals pointed out that the amount of hardware they had available to them was inadequate to fully serve their students. The teacher surveys offer a possible explanation for this disparity, as significantly fewer students were reported to have frequent access to computers when compared to teachers (57% students with frequent computer access versus 77% of teachers with frequent access). Depending on teachers' instructional needs, a situation in which nearly half of the students have limited the use of computers may be inhibiting.

Evidence of Regular Use

While student use of computers may have been more limited than teachers would have liked, the data showed that teachers and principals used technology frequently, and for a variety of reasons. Interview responses from multiple participants indicated that teachers at Al-Ula schools use technology both to prepare and present their lessons. As T1 stated:

I use a projector in my lessons. I am an English teacher. Sometimes I use short YouTubes for students to watch and listen that help my students to learn more as English is a second language in my country. I use the internet to prepare my lessons. I use PowerPoint for present my lessons. I use how to pronounce words to help students.

T1's response demonstrates a range of uses for technology, with what appears to be an attempt to engage students through multimedia presentations. Participants indicated that they regularly use both the internet and common software programs such as Microsoft Word and Microsoft PowerPoint. The teacher surveys also indicated regular computer use among teachers:

Table 4.4
Teacher Survey Data on Self-Reported ICT Use

ICT Application in School—Teacher Functions	Always	Often	Some-Times	Rarely	Never
I use the internet to prepare my lessons	20	26	10	4	1
I use Microsoft word	19	19	15	5	3
I use PowerPoint	17	19	10	11	4
I use the computer to prepare my lessons	35	16	7	2	1
I use the computer to write student exam questions	35	15	7	1	3
I use the computer in students' progress reports	35	10	10	4	2
I use a projector in my lessons	21	13	21	4	2
I use an interactive whiteboard in my lessons.	9	9	7	11	25
I design educational programs for my classes	25	8	10	8	10
I communicate with students and parents electronically	28	11	16	3	3
I communicate with administration electronically	22	18	12	5	4

As the survey data indicates, teachers at Al-Ula schools regularly use technology for a variety of reasons. Around 75% (46/61) of teachers use PowerPoint, while the majority (34/61, 55%) use a projector. Though the exact way these instructors use PowerPoint is unclear from the survey, it is reasonable to assume that many these teachers use PowerPoint to present lessons, just as T1 did. Most teachers also used technology before they gave lessons (i.e. to

prepare their lessons or write exam questions) and afterwards to track student progress. In addition, many teachers (39/61, 64%) used technology to communicate with students and parents.

At the same time, it appears that not most teachers are not using technology interactively with students, using technology more for classroom management and administrative tasks, and for some basic teacher-centered presentation purposes. As T9 stated, he “use the word processing program, use the slide show viewer program, use the computer to prepare lessons, use the computer to create test questions, use the computer for assessment of student performance, use the data projector, use the email.” According to T9, the primary use of technology was administrative, with some usage for teacher-centered presentations as well. In other words, teachers in Al-Ula schools are not taking full advantage of the current capabilities of technology in order to design and create collaborative, interactive, and student-centered learning. That is, they are not creating the kind of engaging, interactive learning environment that Pall and Batra (2016) proposed should be a significant part of ICT implementation.

ICT Training

In addition to having access to resources, it appeared that the principals and teachers who participated in the study also had some training on ICT usage. Along with access to technology, Tearle (2004) cited as training as being an important factor in ICT change implementation. Interviewees consistently revealed that they had at least some formal training in computer use. As P1 stated, “My skill was developed through out-of-school training at my own expense. Like the basics of a computer, I learned about some of the basics of a computer, such as using a word processor, a PowerPoint presentation, creating an email and other computer basics. In my field I got few trainings.” From P1’s description, he did have some computer training, but it was relatively basic and not very comprehensive. T3 had a similar response when he said, “I took school training courses, but very few, each semester I had one course. My external training course helped me learn some computer basics such as using a word processor, PowerPoint slideshow, creating an email, and other computer basics.” Across many of the interviews, participants shared similar responses, noting that they received some training, but that it was focused mostly on basic computer applications (e.g. the Microsoft Office suite), with the exception of one teacher who said they had training on using an interactive white board. Most of the training mentioned was through formal classes, though several participants also mentioned being self-taught. As T4 noted, “Now any teacher can develop his skills from Google and YouTube. I did not take any class about technology in my university.” T4 brought up a potentially important point, noting that not all training needs to be formal or paid classes in order to be effective. The table below shows that teachers at Al-Ula schools have at least moderate levels of training across a variety of computing tasks:

Table 4.5
Teacher Training on Technology

Level of ICT training in	Advanced	Good	Moderate	Poor	No Training
Basic Computer skills	12	21	28	0	0
Microsoft word	9	25	25	2	0
PowerPoint	9	25	24	1	1
E-mail	9	19	21	7	5
Website Design	6	6	11	10	28

Internet browsing	14	9	23	8	7
Printing	28	14	15	2	2
Scanning	0	0	0	0	61
Interactive Whiteboard	6	8	13	8	26
Projector/ Data show	17	20	17	4	3
Computer Maintenance	6	4	13	9	29

As the table demonstrates, most teachers had at least a moderate level of training in basic computing tasks. No teachers had training in scanning, and fewer had training in website design or computer maintenance, though it is reasonable to question whether or not training in these areas should be a high priority for teachers. Fewer teachers also had training on interactive whiteboards, which aligns with the data for ICT use (see Table 1); it is possible that most teachers do not have access to this technology at their school, so training in this area would not be productive.

Missing from the survey are questions about more advanced teaching and learning centered tasks, such as how to engage students with technology and/or develop a more interactive curriculum. Ideally, ICT use would be directed towards that goal (Pall & Batra, 2016). From the principal and teacher interviews, it appears that more training is needed. All of the principals interviewed suggested that more teacher training was needed, and most of the teachers did as well. As T6 stated, “There are no enough training courses for teachers. I see some teachers need training. Sometimes some teachers ask me to help them how to use and run technology in classrooms.” This was a common theme throughout the interviews—it seemed that skill level among teachers was inconsistent, with some teachers being more comfortable with ICT (as in the case of T6, who was asked to be a sort of informal trainer), while some were in need of more training.

Positive Attitudes Towards Technology

As Tearle (2004) pointed out, one of the primary factors in implementing change in ICT use is the attitude and motivation of the users. In order for change to be effective, users must believe that its use will offer significant advantages over other methods, and they should have confidence that they have the necessary resources to use technology. Data from this study showed that teachers and principals had an overall positive attitude toward the advantages that IT offered them. As T2 pointed out:

The best way to use learning technology to teach for several reasons facilitates the teaching process for the teacher and the learner and facilitates the delivery of information with the least effort and time in a smooth and enjoyable way - motivates students to social work as groups - facilitates the speed of the student and the teacher to obtain the information through research and obtain the information from its reliable sources.

T2’s comments demonstrated a belief that there are multiple advantages to using technology. This teacher implied that the entire teaching process was not only made more effective and efficient through the use of ICT, but that it was more enjoyable as well. In addition, this teacher believed that ICT could help students work together in groups, suggesting that ICT facilitated a collaborative learning environment. T9 also noted that “with this generation, I prefer to use educational technology to teach, because we are in time of cognitive explosion and some students may get bored of using the traditional method.” As T9 suggested, he preferred to teach with technology as students who had become more accustomed to technology use could become bored with traditional teaching methods. Throughout the

interviews, teachers echoed these motivations for using technology, and demonstrated that they have a positive attitude toward technology use. The principals who were interviewed also had a consistently positive attitude toward technology use. For example, P2 stated “the use of technology has become necessary to keep up with the development in the learning process. The use of technology gives the teacher more room to communicate information to students than the traditional method.” With this perspective in mind, it is reasonable to assume that this principal would be highly supportive of teachers using ICT, as would the other principals interviewed for this study who shared similar views.

These overall positive attitudes and beliefs about ICT use are also reflected in the teacher and principal surveys. As the table below shows, teachers believed in the value of ICT use in their work:

Table 4.6
Teacher Attitudes Towards ICT Use

<i>Teacher Views About ICT in Education</i>	SA	Agree	Neutral	Disagree	SD
ICT has an important part to play in teaching and learning generally.	20	38	3	0	0
Using ICT is a dull activity	0	0	2	9	50
ICT makes work easier	45	10	6	0	0
ICT makes teaching enjoyable, changes routine, and keeps boredom at bay.	19	32	6	4	0
ICT improves students results	17	25	10	9	0
Using ICT can save time and effort	18	29	8	5	1
ICT increases cooperation between teachers and students	15	20	18	8	0

As the table indicates, nearly all teachers believed that ICT made their work easier (55/61, or 90%) and that ICT had an important role to play in education (58/61, or 95%). The data also suggests that ICT makes learning and their work more enjoyable, with most saying that ICT made teaching more enjoyable and less boring (51/61, or 84%), and none saying that ICT made their work dull. These findings are mirrored in the principal surveys, with all principals responding that ICT use made work easier and more enjoyable. All principals also responded that ICT improved student results increased cooperation between students and teachers. Fewer teachers stated that ICT improved student results (42/61, or 69%) and improved cooperation between students and teachers (35/61, or 57%), but a majority still agreed with these statements. Overall, the data demonstrates that teachers and principals believe in the advantages that ICT offers, have a positive attitude toward its use in general and are likely to be motivated to implement ICT changes in the future. These findings suggest some promise as it pertains to implementing change in ICT use, as this positive attitude is one of the main criteria for change established in Tearle (2004).

Dissatisfaction with Technology Implementation

On the other hand, the data suggests that the views toward technology implementation are not entirely positive. It is worth noting that every person interviewed, both teachers and

principals, stated that they were not satisfied with the current status of technology implementation at their school. For example, P1 stated that he was “certainly not satisfied at all” with ICT use at his school. As Table 3 shows, this dissatisfaction was common among teachers in Al-Ula schools:

Table 4.7
Teacher Dissatisfaction with ICT

<i>Level of Satisfaction with ICT</i>	Extremely Satisfied	Satisfied	Neither satisfied nor dissatisfied	Dissatisfied	Extremely Dissatisfied
The current situation (Availability and Use of ICT tools) in your school	2	3	0	50	6
Outcome of using ICT tools in education	0	4	8	44	4
ICT Training	0	2	13	46	0
Ongoing development in the integration of ICT tools in your school	1	8	1	44	7
Your ICT skills	0	0	21	38	2
Your role in towards ICT implementation	0	6	9	46	0
ICT policy (goals and clarity)	0	3	13	41	4

As the table indicates, teachers who participated in the surveys are overwhelmingly dissatisfied with ICT use at their schools. Nearly all were dissatisfied with the current ICT situation at their school (56/61, or 92%), and nearly three quarters (48/61, or 72%) were not satisfied with educational outcomes of ICT use. The principal surveys showed even lower levels of satisfaction, with no principals indicating that they were satisfied with any of the above measures. However, there was a slight uptick in teacher satisfaction with the ongoing integration of ICT tools at their school, which suggests that there might have been some growth in that area for those teachers.

Though it is difficult to say with certainty given the general nature of the survey questions, the fact that so many teachers were dissatisfied with their current roles in ICT implementation (46/61, or 74%) could be interpreted as a positive sign. It is possible that they were dissatisfied with their roles because they want to be more actively involved. In other words, they do not have the resistance to change that Tearle (2004) suggested can stifle ICT implementation. Interviews with principals support the notion that resistance to change was not a common phenomenon in the schools, as those who commented on it noted that the teachers who resisted technology use were the exception to the rule. As P1 noted, “some older teachers do not prefer to use technology. I have three teachers in my school that say they are not satisfied with using technology in classroom.” While widespread resistance to change can be a barrier to ICT implementation, it is reasonable to assume that unanimous support for change within a school, while likely nearly impossible to achieve, is not necessary.

Additional Obstacles to ICT Use

In addition to some of the challenges discussed above, participants in this study pointed to several obstacles to ICT implementation in Al-Ula schools. Based on Tearle’s (2004) framework, these obstacles could impact the change implementation process, and are more situated at the whole school level than at the individual level, as most teachers appeared to have

a positive attitude toward ICT, to have a belief in the value of ICT implementation, and to have the basic computing skills necessary to learn more advanced uses.

Inadequate or Obsolete Technology

As noted previously, Al-Ula schools appeared to be equipped with a range of technology, and most teachers appeared to have regular access to that technology. At the same time, the teachers and principals who were interviewed for this study pointed out that the technology they had access to was inadequate or obsolete. Nearly everyone interviewed noted that the internet was too slow for their needs. As P4 noted, “In my school internet is slow. This is a major hindrance in my school. All teachers complain about it.” T7 expanded on this problem a bit further when he said, “Internet is slow and this is one of the most important obstacles to using technology in the school, for example, sometimes I cannot use Google to search or YouTube clips because of the weak internet. It takes time for the search page to open.” From these responses, it appears that the internet was not just a little bit slow, but slow enough that using the internet as an instructional tool is not possible. It also appeared that this problem is causing some frustration among teachers, which could eventually affect their motivation and willingness to implement ICT. The teacher and principal surveys supported the interview findings, with all principals (9/9, 100%) agreeing that the internet posed a challenge, and nearly all (56/61, or 100%) of teachers agreeing with that statement.

In addition to the slow internet connection, participants noted that the hardware and software did not operate efficiently. As P1 stated: “The computer lab is old. For example, the computers in the computer lab are old and do not accept the update. For example, Windows 10 cannot update the devices because they are old. You know that the possibilities for schools are very limited.” T2 shared a similar sentiment when he said, “All computers including hardware and software are old. We cannot update them.” Across the interviews, most teachers and principals noted that the hardware and software were out of date, resulting in compatibility issues between software and hardware, problems updating systems, and an overall lack of efficiency. These findings support those of Al Mulhim (2014), who noted the negative impact of limited access to reliable computer technology on attempts to implement ICT in Saudi Arabia.

Lack of Financial Support/Lack of Resources

One logical explanation for the inadequate or obsolete technology was a lack of financial support from the Ministry of Education. As computer hardware and software can be costly and become obsolete when outdated, this was clearly an issue of concern among principals. For example, P2 stated that there was a “lack of financial resources from the Ministry, meaning the school budget is not enough to buy computers for the number of students,” a statement echoed by P2 when he said “the Ministry of Education has not equipped and provided classrooms technologies.” According to these principals, they have inadequate supplies of technology, as not received either the equipment they need or funds to purchase the equipment themselves from the Ministry. On the principals, the majority (5/4, or 56%) agreed with the statement that a lack of financial support was a barrier to ICT implementation, while 3 were neutral on that statement, and only one disagreed.

The teachers in this survey also noted the lack of financial support and/or lack of resources needed to effectively use technology in their work. As T6 stated, “There is not enough budget in my school to buy or fix computers,” a sentiment echoed by T7 when he said that there are “weak financial resources. When I ask school leader to bring new projector he said there no money in school budget.” From these statements, it appears that these teachers had inquired

about getting the equipment they needed, but were denied for financial reasons. As a result, they lacked the technological resources they needed to implement ICT usage. The teacher surveys demonstrate that this was a widespread problem at Al-Ula schools. On those surveys, most teachers (56/61, or 92%) noted that there was a lack of financial resources needed to implement ICT. Most teachers (51/61, or 84%) also noted that they lacked the ICT tools they needed. As these responses indicate, additional financial resources may be necessary for Al-Ula schools to fully implement ICT usage.

Lack of Maintenance and/or Technical Support

Perhaps related to obsolete or inadequate hardware and software, participants in this study frequently pointed to a lack of maintenance and/or technical support as a problem that hindered ICT implementation. In most cases, it appeared that there was no one on staff at the school whose role was to provide that support. As P4 stated:

There is no technical support in the school sometimes the internet is broken and we do not know how to fix the problem so we contact the maintenance department and send a technician to fix the problem. The technician takes about two weeks to come to the school and repair the equipment. In addition, sometimes some devices in the middle of the semester fail, and it takes time to request technical support to repair the devices, and this is one of the challenges that hinder the use of technology in the school due to the lack of a technician in the school. Sometimes some teachers ask a technician at his own expense and pay for it.

In this statement, P4 points to several problems with technical support and maintenance at the school. First, the technician was located somewhere off-site, and the work request took two weeks to fulfill, meaning the technology was not in use during that time. Second, if the technology broke down in the middle of the semester, any instruction that might have happened with that technology would be prevented or delayed. And third, teachers were sometimes required to pay for technical support out of their own pocket, which should not be their responsibility. T6 brought up very similar issues when he said:

There is no maintenance inside the school for the devices and no technical support. If a device break down, I will request technical person from the maintenance department but technical takes a week to come to my school. Sometimes he cannot fix the device because there are no spare parts available for the device. Last year I repaired devices from my own money. In addition to the length of time it took to get technical support, the support this teacher eventually received was sometimes inadequate, as the technician was not properly equipped to fix the device. For lack of a technician on staff also meant that the ICT was not getting the kind of maintenance that might prevent failures from occurring in the first place, and might also extend the life of technology and take longer to become obsolete.

According to the teacher and principal surveys, a lack of technical support was a widespread problem at Al-Ula schools. All nine principals surveyed said that a lack of technical support posed a challenge to ICT implementation at their schools, while nearly all teachers (56/61, or 92%) agreed with that statement. This data clearly demonstrates that a lack of technical support hindered ICT implementation at Al-Ula schools. This lack of technical support further contributed to a situation in which the technology at the schools was unavailable for use, inadequate, and/or obsolete, making it another practical factor that would hinder change in ICT implementation (Tearle, 2004).

Lack of Strategic Planning for IT Use

In the interviews, principals were asked about their involvement with technology, especially as it pertained to their role as an educational and instructional leader on their campuses. All of principals displayed positive attitudes toward technology use, often appearing to view themselves as motivators or role models for technology use. However, beyond their role as motivators, they did not appear to have a clear strategic plan in their approach to ICT implementation. For example, P1 stated, “The role that I play in my school as an educational leader is to bring my laptop with me every day. Encouraging teachers and students to use technology in school. I repair and some devices in my school and buy some projectors from my own money.” Based on this response, this principal placed value on his role of encouraging the use of ICT, though his method of doing so was passive (i.e. “bringing his laptop” every day). Other than that, he also acted as a substitute for technical support, and paid for resources outside of his budget. Neither of these actions would normally fall under his role as a school leader.

P2 took the role of encouraging computer use a step further, stating that he “gave giving awards to teachers who use technology continuously, and I am also evaluating the teacher for using class technology.” For P2, it appeared that encouraging technology use meant using more of a punishment/reward system, with teachers who used technology receiving awards, while those who do not might get a negative evaluation. Like P1, P2 demonstrated a high level of support for teachers using technology, but also offered additional rewards and incentives (i.e. awards, positive performance evaluations). At the same time, while both P1 and P2 were personally support of ICT, neither mentioned a clear schoolwide strategic plan or initiative that would provide institutional support for ICT use among teachers. This theme emerged in the interview data collected from each principal, like P3, who stated that he:

Created a special site for the presence and absence of teachers and students, and for all activities within the teacher, approximately 50% of the teacher’s work on this site. All devices and batteries in the classrooms are teachers and educational leader. In addition, in the school we were able to train teachers who need improvement in their skills. I try to do everything I can to develop the educational process.

While not tied to a strategic plan, this principal was clearly more actively involved in providing institutional support for ICT use, and he appeared to be trying to address some of the challenges that arose with ICT implementation.

However, it may be that the ways in which principals believed they were encouraging technology use did not translate into teachers feeling like they were being supported, at least not widely across AI-Ula schools. According to the teacher surveys, only 20% (12/61) of teachers agreed with the statement that they received support and encouragement when they used ICT in their lessons. Though the surveys do not make their reasoning clear, it may be that teachers are not receiving encouragement, and/or the encouragement that they are being given is not having its desired impact. Either way, principals’ attempts at encouragement may not be an adequate substitute for clearer strategic plan for ICT implementation.

Lack of Clear Direction from the Ministry

While none of the principals appeared to have a clear strategic plan for technology use in their schools, one explanation for this finding could be a lack of direction or policy from the Ministry of Education. The principals interviewed noted that there was no clear governmental policy for technology use. P2 noted that, as it pertained to ICT use, “The education policy is unclear,” a statement supported by P1 when they said the policy was “not clear and we have not received any official document regarding the use of technology by teachers or the obligation of teachers to use it in school.” From surveys with principals, most (7/9, or 78%) agreed that the ICT policy was unclear, and all of them disagreed with the statement that they receive

encouragement and support from the Ministry of Education when they use ICT in their schools. Almost all of the teachers also appeared to be unclear on the ICT policy, with only 4 of 61 surveyed (7%) stating that they thought the policy was clear. However, it should be noted that teachers were less likely to view it as their responsibility to implement the policy, as only 4 of 61 (7%) disagreed with the statement that it was the role of the principal to implement the policy. In other words, have a clear sense of the policy may be useful to a principal whose role it is to implement it schoolwide, but not absolutely necessary for teachers, as long as there is a coherent plan and adequate support at the local level.

However, it appears that principals have not received clear direction, support, or official policy from the Ministry as it pertains to technology use. This has potentially created a situation in which principals lack the direction needed to develop a strategic plan to implement technology use in their schools. These findings support Al Mulhim's (2014) findings about the perceived lack of support from the ministry and its impact on ICT implementation. These findings also conflict with the Ministry of Education's (2019) own claims about the importance of learning through technology, or at the very least demonstrate that government-level objectives had not reached local schools at the time data for this study was collected.

Lack of Incentives from The Ministry

All of the principals interviewed noted that there was also a lack of incentive from the ministry to encourage ICT implementation. All of the principals interviewed mentioned this issue, directly stating or implying that it was an obstacle to implementing technology use within their schools. As P3 stated:

There is absolutely no support or incentives from the Ministry, and this is considered one of the obstacles, because some teachers feel frustrated at the ministry's lack of interest in their efforts as well as the application of technology.

According to P3, a lack of support or incentives for technology was an obstacle to technology use as it appeared to frustrate teachers and dampen their enthusiasm for implementing technology. P1 echoed this sentiment when he said that "teachers need motivation and support encouragement to implement ICT in schools. Unfortunately, there is no motivation from the Ministry." As both P3 and P1 noted, the apparent lack of encouragement at the government level was felt as a lack of motivation or incentive at the local school level, resulting in frustration amongst teaching staff. If true, these findings would confirm those of Oyaid (2009), who pointed out that teachers need support and encouragement in order to feel motivated to integrate technology use into their instruction.

At the same time, it is possible that incentives from the Ministry of Education are not as essential to ICT implementation as the principals who participated in this study believed. In the interviews, the principals made a direct link between teacher motivation and incentives from the Ministry. Some teachers also mentioned that they did not receive incentives from the Ministry, but did not make a direct link between those incentives and their motivation to use technology. On the teacher surveys, most teachers (51/61, or 84%) agreed that there was a lack of incentives to use ICT, but it was unclear whether they expected that encouragement to come from the Ministry, and it was unclear how those perceived lack of incentives impacted their motivation to use technology. As mentioned previously, the teachers who participated in this study had an overall positive attitude toward ICT use and believed in the benefits it offered in their work. That is, they appeared to be intrinsically motivated to use technology, and extrinsic motivation coming from the Ministry might not have been necessary. Additionally, as only 20% (12/61) of teachers stated that they received support and encouragement from the principals at their schools, a better focus for extrinsic motivation may be at the local school

level. Of course, further incentives from the Ministry would likely also be appreciated, regardless of whether or not they are necessary.

Participant Recommendations

As part of this study, participants were asked to discuss the recommendations that they would make to improve ICT implementation at Al-Ula schools. As might be expected, their recommendations consistently mirrored the challenges that they discussed. For example, a participant who stated that there was a lack of financial resources to purchase ICT hardware and software would recommend that additional financial resources were needed. A participant who indicated a lack of clear direction from the Ministry would recommend that more direction was needed, and so on. This pattern repeated itself throughout the data set.

Improve ICT Resources

Since the technology that teachers and principals had available in their schools was inadequate or obsolete, one of the most common recommendations that participants made was to improve the quality of technology available at their schools. Though the participants often did not directly say they needed more funding from the Ministry for this technology, it can be reasonably be assumed that the Ministry would need to provide these resources for schools. As P3 stated, schools should be provided with “modern and adequate equipment for all students,” an idea echoed by P4, who recommended that there needed to be “modern computertechnology, because now in my school there are old computers, hardware, and software and we can can’t update them.” P4 also pointed out that his school needed not just more up-to-date technology, but more computers so that there would be a better ratio of computers to students. He said that schools should be provided with “devices based on the number of students, so that mean each student should has an independent device computer. In my school there is no computer for each student.” This recommendation is understandable and would no doubt be useful in helping to achieve the ultimate goal of using ICT to create a more student-centered learning environment, per the suggestions of Ball and Patra (2016), Pelgrum (2001), and Edwyn (2001). However, given the level of resources and material support currently provided by the Ministry at the time of the study, that level of funding did not appear likely in the near future.

Teachers also recommended that the schools invest more in ICT resources, stating that there should be “a sufficient budget is set for each school so that every school leader equips his school with all the technology,” and that the school should provide “fast internet,” and “equip all classrooms with modern devices.” These recommendations, including the recommendation to improve internet speed, were frequently repeated across the data set. The recommendation that schools should provide sufficient ICT resources received nearly unanimous support on teacher and principal surveys, with 58/61 teachers (95%) and all nine principals agreeing that providing these resources was important.

Improve Maintenance and/or Technical Support

Participants in this study noted a problem that very likely compounded the overall inadequate and/or obsolete ICT equipment and infrastructure: the lack of maintenance and/or technical support. As such, it should come as no surprise that participants recommended that Al-Ula schools improve the quality of technical support that they had available to them. For example, P1 recommended that “continuous maintenance and technical support” be provided in schools. P3 made a similar suggestion while linking it to the school budget, recommending an “increase in school budgets for maintenance and technical support.” Several teachers made similar recommendations, including T7, who noted a need for “regular maintenance for all the

schools.” Nearly all of the participants who completed the surveys also noted a need for better technical support, with all nine principals and 59/61 (97%) of teachers surveyed agreeing with the recommendation for improved technical support and maintenance.

Provide ICT Training

Recognizing that there was a need for additional training on ICT usage, many participants in this study recommended that the Ministry and/or the schools focus on technology training. For example, P4 recommended that the school provide “more training for teachers how to use ICT in schools.” This recommendation was also given by P1, who stated:

I recommend that the ministry of education focus on professional development because there is a lack of training from the Ministry of Education. In my school the technology teacher and resource room teacher train all teachers. That is not enough.

As P1 noted, the “training program” in his school consisted of a technology teacher and a teacher who oversaw the resource room also training teachers on technology use, which was inadequate to serve the training needs of the school. As these teachers had other primary responsibilities, they very likely were not able to give teacher training the attention it requires. Many of the teachers interviewed also recommended that teachers receive more training from the Ministry. For instance, T1 stated, “We need training courses from the Ministry on how to use the technology. Most teachers take courses training out-of-school on their own account in order to develop their technical skills.” From T1’s perspective, more training would not only help improve technical skills, but also prevent a situation in which teachers would need to pay for training offered outside of the school. The recommendation to offer more training was also strongly supported in the teacher and principal surveys, with nearly all teachers (59/61, or 98%) and all principals agreeing that training teachers on ICT usage was a valuable recommendation. In this way, the findings from this study support those of Al Mulhim (2014) and Asan (2003), who argued that teacher training programs were an essential part of ICT implementation, especially as they can help teachers improve not just their technical skills, but also their ability to integrate ICT with their instruction.

Provide Clear Direction from the Ministry

Teachers and principals who participated in this study also recommended that there be more clear direction from the Ministry on the ICT policy and how to implement it. As T10 stated, “integrating technology with education means that the Ministry adopts all equipment and has a clear plan and strategy on using the technology.” For T10, receiving better plans from the Ministry would aid in the integration of technology in the classroom. P1 was even more forceful in his recommendation. He stated, “My recommendation is the Ministry must adopt technology use in schools and compel and force all schools to use it. I recommend the Ministry of Education to draw a plan and strategy for implementing technology in schools.” For P10, adopting technology should not be optional, and should come with both a clear plan on how to implement technology, and a requirement that all schools follow that plan. The surveys also strongly supported this recommendation, with 7/9 (78%) of principals recommending that the Ministry provide a clear ICT policy, and 55/61 (90%) of teachers recommending that the Ministry provide a clear ICT policy. In this way, the findings of this study support the findings of Alshammari (2014) and Ball and Patra (2016), who noted the significance of having a clear ICT policy from the Ministry in order to successfully implement ICT usage in schools.

Conclusion

Findings drawn from interviews and surveys collected from teachers and principals offered insights into the current status of ICT in Al-Ula schools and highlighted the challenges these schools were facing in their efforts to use ICT. Viewed through the lens of Tearle's (2004) *A Theoretical and Instrumental Framework for Implementing Change in ICT in Education*, the responses from participants offer insight into both the practical and attitudinal factors that contribute to and/or hinder change in ICT implementation. In particular, the findings from this study demonstrated that:

- While teachers appeared to have access to a range of ICT hardware and software, this hardware and software was inadequate for multiple reasons. The findings showed that much of the technology was obsolete, not functioning effectively (including slow internet access), and/or did not adequately meet the needs of students and staff. There were several possible causes noted for this condition: the technology itself was outdated or not working properly; schools were not given the necessary funding from the Ministry of Education; schools did not have on-site technical support staff; and there were not enough computers to allow for students to use them collaboratively.
- Most teachers and principals appeared to have some ICT training, but more training is likely needed. In general, teachers and principals appeared to have knowledge and training for basic computing tasks. However, implementing newer or more advanced technologies would likely require more training, as would implementation of more collaborative or interactive teaching methods.
- Although teachers and principals noted their dissatisfaction with the current status of technology use in their schools, most teachers also demonstrated a positive attitude toward technology use. Most teachers appeared to recognize the value and benefit of technology, and would likely be motivated toward changes in ICT implementation.
- The principals who participated in this study indicated a high level of encouragement and support for technology use. However, they did not appear to have a clear plan for technology implementation beyond being encouraging and supportive. One possible contributing factor to this lack of strategic planning was a lack of clear policy and direction from the Ministry of Education.

The findings in this study point toward the use of Tearle's (2004) theory of change as it pertains to ICT implementation. According to this theory, change implementation is most effective when it takes four factors into account: the organization, the individual, practical and material artefacts, and the change process itself. The findings suggest that improvement is needed in all of these areas within Al-Ula schools. A more in-depth discussion of this theory and its application to Al-Ula schools will follow in the next chapter. Chapters five and six will provide a discussion of the results and make recommendations for both future practice in the schools of the Al-Ula School District and future research, based on the findings from the current study.

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