Identifying Existing Information and Communication Technology (ICT) Skills of Secondary School Teachers: A Survey Study

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Abstract
Information and communication technology (ICT) is a field that focuses on modern computer software used in education and training to improve students' learning abilities and the professional competence of teachers This research is a descriptive and quantitative investigation involving 290 government secondary school teachers in the Chiniot area. The questionnaire was developed by the researcher, who sought expert advice to verify its validity. A pilot testing with 20 teachers was conducted to test reliability of the instrumentfor which the value of Cronbach alpha (α = 0.850) was, indicating high reliability. Descriptive statistics such as frequency, percentage and mean scores were calculated to describe the current status of the respondents' demographic variables and existing level of their ICT skills. The findings of the study showthat most of the teachers are confident in digital instruction skills, having ahigh percentage ranging i.e., 83.5% to 94.5% are able to solve problems, can install software, type document, create web page, edit graphics, and integrate ICT and smartphones. This highlights their positive attitude towards digital technology and they proficient in ICT.
Keywords: Information and communication technology (ICT), Secondary School Teachers, ICT skills.

Introduction
In the 21st century, technology has considerably affected the education, requiring the integration of Information, Communication, and Technology (ICT) into the curriculum. By this instructional quality, accessibility, and cost-efficiency is continuously improving. The role of the

teacher in implementation of ICT in traditional classroom could not be avoided. ICT help in providing a vibrant and practical learning atmosphere. By the integration of ICT Students are the direct beneficiary as theycoverunlimited curriculum and content (Shah 2021). During the COVID-19 pandemic the need arises to focus on secondary school teachers' ICT skills for successful integration, curriculum understanding, and digital literacy. This knowledge aids educational policymakers and administrators in developing quality education plans and supports professional development programs(Flores &Gago, 2020).

Literature Review

A study by Chaiban&Oweini, (2024) revealed that teachers have a positive attitude towards ICT integration in the classrooms, but found no major association between their attitude and experience in terms of number of years. The study alsorevealed moderate to low ICT use and negative relationship between ICT usage in classrooms and experience.The results contrast with existing literature, which generally links positive attitudes towards technology to increased use of ICT in education.A study by Valverde-Berrocoso et al., exposed some teaching practices based on ICT and spaces with digital technologies, but also identified some flaws in digital competence and training models designed to train the educators. It emphasized on training models that ensure flexibility and adaptability in educating the teachers. These models must promote the lifelong and pace learning. Another study's (Gangmei& Thomas (2025)findingssuggested that teachers' ICT proficiency would increase instructional effectiveness, ultimately raising educational standards.According to a Bitegeko et al., (2024) in their UNESCO ICT competency study, student and teachers have moderate level of digital competencies, with a no connection between their advanced pedagogical uses of technology and their basic technical skills.

Current scenario of teachers' ICT skills

Seufert et al., (2021) in their study indicated how the afterword to the exceptional broadens the perception of technology integration by taking into consideration organizations and cultures of practice. Quantitative studies stated the current state of technology but artificial intelligence has not exploited in learning. Moreover, the literature in study of Rakisheva&Witt (2023) emphasized on the need for a validated pre-service teacher's digital competence framework, guiding initial teacher preparation and integrating technologies into pre-service teacher education.The study by Niyazova et al., (2023) showed that teachers' knowledge and perception toward the integration of ICT is high. Further, this study found that despite acknowledging the importance of the enjoyment of integrating the ICT in the learning process, teachers identified the aspects of learners' lack of technological literacy and infrastructure, and lack of motivation can be barriers for the success of the ICT integration. For such challenges, the study also revealed that teachers attempt to practice a sort of home visit and invitation learning and encouraging the making of soft skills for class activity management. These findings expectedly contribute to define the role of ICT in the current pandemic era. Studies show varying levels of digital competency in educational contexts, with moderate levels of knowledge acquisition and deepening among student-teachers, suggesting underdeveloped advanced pedagogical applications of technology (UNESCO 2024).

Impact of COVID-19 on teachers' ICT skills and digital transformation

The COVID-19 pandemic has served as an unprecedented catalyst for examining and accelerating teacher ICT skills development in secondary education. The execution of emergency remote education emphasized both the critical importance and prevailing gaps in teacher digital competencies all over the world.Konig, Jager-Biela &Glutsch (20202) analyzed that information and communication technologies (ICT) tools, particularly digital teacher competence and teacher education opportunities to learn digital competence, are helpful in adapting to online teaching during COVID-19 school closures. The findings indicate that the COVID-19 pandemic has been a catalyst for teacher innovation and development. Teachers went through a three-phase period of innovation as they responded to the school closures and adjusted to the new digital environment. In order to more support their innovation, teachers engaged in both school and teacher-initiated professional development. The findings have theoretical implications, proposing a model to explore innovation during times of crisis, "Phases of Innovation in Response to Crisis Process". They also have practical implications, providing examples of innovations adopted by teachers during this period of radical change (Moorhouse& Wong 2021).The coronavirus crisis has significantly impacted education, with almost all countries closing schools in 2020. International organizations have emphasized the need for structural policy reforms to address challenges. Three main areas of response include digitalization, educational inequalities, and teacher development. These responses are similar to pre-pandemic agendas and instruments. However, the intensity and type of responses vary among European Union member states, reflecting the unique characteristics of their educational systems and the main issues revealed (Zancajo. Verger &Bolea 2022). The COVID-19 pandemic tested the integration of Information and Communication Technologies (ICT) in education, necessitating emergency remote education. Flexible education was crucial for learning continuity. Students and teachers need to develop competencies for self-directed, technology-enhanced learning. Early career teachers' adaptation to online teaching modalities was significantly influenced by teacher education programs and existing competencies.

Factors Influencing ICT Skills Development and Integration

The findings by Boonmoh&Sanmuang(2024) showed four levels of changes due to the curriculum reforms: changing course names, descriptions, topics, and assessments. Along with these changes, the teachers faced several challenges: selecting appropriate ICT resources, insufficient digital literacy knowledge, the need for pedagogical adjustments, insufficient training and support, infrastructure limitations, and time constraints. The study suggests that universities should offer ongoing professional development to help teachers keep up with the changing digital literacy landscape.

Challenges and Obstacles in ICT Skills Development

Raihan et al., (2025) suggested the importance of understanding intersectional characteristics like age, gender, disability, race, ethnicity, Indigenous identity, and immigration status in analyzing digital equity and the digital divide. In another study Jamil (2021) exposed that in Pakistan factors likeurban-rural divide, gender disparity, income and education inequalities, religious and cultural barriers, and policy-related challenges are sources of digital divide.A report by Hendrawan (2024), MSMEs face both opportunities and challenges as they undergo digital

transformation. To increase operational efficiency and productivity, strategic planning, system integration, and staff skill development are crucial.Tzafikou et al (2023) in their study identified digital competence inefficiency among Greek primary school teachers, with lower scores in professional development and teaching delivery & student support, according to a new instrument assessing digital competence.

Digital competency frameworks and standards

Mattar et al., (2022) in his study matched international digital competence frameworks for teacher training, identifying common competencies like communication, collaboration, sharing, and ethics, suggesting segmentation by educational actors and levels.Rakisheva et al., in their paper advocates for a validated pre-service teacher's digital competence framework, adaptable to context, offering recommendations for initial teacher training and technology integration.

Implications for Educational Policy and Practice

Karim (2021) in his study examined acculturation research, identifying gaps and suggesting a culture learning approach to enhance global education and prepare younger generations for interconnected worlds. In another study Chiu (2024) found the influence of GenAI on school education, involving 88 teachers and leaders, and has identified four main themes, 12 subthemes, policy implications, AI education, and professional standards.Ratten& Jones (2023) explored ChatGPT, and a generative AI, as transformed tools for assessment, but its untraceable nature presents challenges for educators.

Methodology

Basically, this research is a descriptive type and quantitative investigation. So, the researcher of this research adopted a descriptive research design to collect the quantitative data from a large number of respondents by using a survey method. The population of this research consisted of all male and female government secondary school teachers in the Chiniot area. The researcher has chosen 300 secondary school teachers from Chiniot District's government secondary schools to participate in the study as respondents. The researcher selected the sample using a simple random sampling methods. The investigator conducting the current study has developed a questionnaire in order to collect information from the people who are taking part in the inquiry. the investigator conducting the current study has developed a questionnaire in order to collect information from the people who are taking part in the inquiry. The researcher of the study sought the advice of experts in order to verify the validity of her research tool (questionnaire) and conducted pilot study with 20 teachers to test instrument reliability. The instrument (questionnaire) is reliable and suitable for data collection as Cronbach alpha (α = 0.850), indicating high reliability. In order to complete the stage of data collection, the researcher personally visited the sample government boys' and girls' secondary schools in the Chiniot District to collect data. Descriptive statistics such as frequency, percentage and mean scores were calculated to describe the current status of the respondents' demographic variables and existing level of their ICT skills.

Result and Discussion:
Demographic Information of the Teachers
Table 1.1: *Description of Teaching Subject of the Teachers*

Teaching Subject	Frequency	Percent	Valid Percent	Cumulative Percent
Belongs to Arts	112	38.6	38.6	38.6
Belongs to Science	178	61.4	61.4	100.0
Total	290	100.0	100.0	

According to table 1.1 there are 112 (38.6%) Arts teachers and 178 (61.4%) Science teachers. The number of science teachers is significantly higher than arts teachers.

Table 1.2: *Description of gender of the Teachers*

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	86	29.7	29.7	29.7
Female	204	70.3	70.3	100.0
Total	290	100.0	100.0	

According to table 1.2 Male teachers 86 (29.7%) and Female teachers 204 (70.3%). The number of female teachers is significantly higher than male teachers.

Table 1.3: *Description of locality of the Teachers*

Locality	Frequency	Percent	Valid Percent	Cumulative Percent
Urban	150	51.7	51.7	51.7
Rural	140	48.3	48.3	100.0
Total	290	100.0	100.0	

In the light of the data findings that are demonstrated in Table 1.3 there are 150 (51.7%) Urban teachers and140 (48.3%) Rural teachers. The number of urban teachers is slightly higher than rural teachers, with a relatively even distribution.

Table 1.4: *Qualification of the Teachers*

Qualification	Frequency	Percent	Valid Percent	Cumulative Percent
BS/MA/MSC MPhil	220	75.9	75.9	75.9

PhD	58	20.0	20.0	95.9
Other				
Total	4	1.4	1.4	97.2
	8	2.8	2.8	100.0
	290	100.0	100.0	

According to Table 1.4 there are 220 (75.9%) BS/MA/MSc and 70 (24.1%) MPhil/PhD/Other teachers. The majority of teachers (75.9%) have BS/MA/MSc qualifications, while a smaller proportion (24.1%) have MPhil/PhD or other higher qualifications.

Table 1.5

Teachers' Teaching Experience

Experience	Frequency	Percent	Valid Percent	Cumulative Percent
	212	73.1	73.1	73.1
1-10 years	74	25.5	25.5	98.6
11-20 years				
Above 20 years	4	1.4	1.4	100.0
Total				
	290	100.0	100.0	

Based on the data discoveries that are reported in Table 1.5, there are 212 (73.1%) 1-10 years and 78 (26.9%) 11-20 years or above. The majority of teachers (73.1%) have 1-10 years of teaching experience, indicating a relatively young and less experienced teaching workforce.

Table 1.7: *Ownership of Digital Devices of the Teachers*

Digital Devices	Frequency	Percent	Valid Percent	Cumulative Percent
	50	17.2	17.2	17.2
Laptop	28	9.7	9.7	26.9
Tablet				
Android Cell	200	69.0	69.0	95.9
Computer				
Total	12	4.1	4.1	100.0
	290	100.0	100.0	

According to the data outcomes that are presented in Table 1.7 about ownerships of digital devices, 50 (17.2%) Laptop, Tablet 28 (9.7%), 200 (69.0%) Android Cell and 12 (4.1%) Computer.

The majority of teachers (69.0%) own Android cell phones, while laptop and computer ownership is relatively low.

Table 1.8

Usage of Digital Devices of the Teachers

Use of Digital Devices	Frequency	Percent	Valid Percent	Cumulative Percent
	186	64.1	64.1	64.1
Studying Entertainment Other	12	4.1	4.1	68.3
Total	92	31.7	31.7	100.0
	290	100.0	100.0	

According to the data outcomes that are shown in Table 1.8 about usage of digital devices, Studying 186 (64.1%) Entertainment 12 (4.1%), and Other purposes 92 (31.7%). Most teachers (64.1%) use digital devices for studying, while a small percentage (4.1%) use them for entertainment.

Table 1.9: *ICT Skills of the Teachers*

ICT Skills	Frequency	Percent	Valid Percent	Cumulative Percent
	10	3.4	3.4	3.4
Poor Acceptable	124	42.8	42.8	46.2
Good	110	37.9	37.9	84.1
Very Good Total	46	15.9	15.9	100.0
	290	100.0	100.0	

According to the data results that are reflected in Table 1.9 about teachers' personal ICT skills, there were 10 (3.4%) poor, 124 (42.8%) acceptable, 110 (37.9%) good and 46 (15.9%)very good. Most teachers (42.8%) rated their personal ICT skills as "Acceptable", followed closely by "Good" (37.9%).

Descriptive Analysis of Teachers' Responses

Sr. No.	Statement	Dis-agree	Un-decided	Agree	M	SD
1	I can solve simple technical problems of my digital device.	9.0%	6.2%	85.0%	3.92	.811
2	I can install software, programs to my digital device easily.	9.0%	6.9%	84.0%	4.01	.876
3	I can type anything through my digital device.	3.5%	4.8%	91.7%	4.20	.740
4	I can solve problems with MS office application and other office software without help.	13.8%	7.6%	78.6%	3.88	.988
5	I use online tutorials to learn how to use software that I want to use in teaching.	9.0%	7.6%	83.5%	4.01	.840
6	I know how to make a simple web page		3.1%	65.5%	3.59	1.088
7	I know how to edit a picture or graphic.	9.0%	7.6%	83.5%	4.01	.846
8	I can search for animations that are relevant to my course and use them.	6.2%	9.7%	84.1%	3.97	.789

9	I can give lessons in class with the help of presentations (PowerPoint).	4.8%	4.8%	90.4%	4.12	.758
10	I can search online for lesson-related videos to show students.	2.8%	2.8%	94.5%	4.17	.637
11	I know how to use search engines well.	5.5%	8.3%	86.2%	4.03	.810
12	I know the use of social networking sites for educational purpose.	2.8%	3.4%	93.8%	4.26	.655
13	I am comfortable using ICT in my teaching.	4.8%	4.8%	90.4%	4.07	.731
14	I use my Smart Phone to teach or learn, which makes me happy.	4.2%	4.0%	91.8%	4.15	.738
15	I use YouTube videos in teaching, which makes me feel good.	7.0%	3.4%	89.6%	4.13	.850

It is evident from the statistical results that are reported in statement number 1, most of the teachers (85.0%) believe they can solve simple technical problems with their digital devices. It is also apparent from the figure of mean (M=3.92) and standard deviation (SD=.811) that is supporting this question and falls under a good agreement level.According to statement 2, most of the teachers (84.0%) believe they can easily install software/programs on their digital devices. It is also noticeable from the figure of mean (M=4.01) and standard deviation (SD=.876) that is supporting this question and falls under a good agreement level for the question "I can install software, programs to my digital device easily.According to statement 3, most teachers (85.0%) are confident in solving simple technical problems (85.0%) and typing on digital devices (92.0%). It is also visible from the figure of mean (M=4.20) and standard deviation (SD=.740) that is

supportive to this question and falls under a good agreement level for the statement "I can type anything through my digital device.According to statistical results that are reported in statement 4,most of the teachers (85.0%) believe they can solve problems with MS Office and other office software without help.It is also apparent from the figure of mean (M=3.92) and standard deviation (SD=.811) that is supporting this question and falls under a good agreement level.In view of the numerical results that are described in statement 5, most of the teachers (83.5%) believe that they can use online tutorials to learn how to use software that they want to use in teaching. It is also visible from the figure of mean (M=4.01) and standard deviation (SD=.840) that is favoring this question and falls under a good agreement level.According to statistical results that are reported in statement number 6, most of the teachers (65.5%) believe thatthey know how to make a simple web page. It is also visible from the figure of mean (M=3.59) and standard deviation (SD=1.088) that is supporting this question and falls under a good agreement level.According to statistical results that are reported in statement number 7,most of the teachers (83.0%) know how to edit pictures or graphics. It is also apparent from the figure of mean (M=4.02) and standard deviation (SD=.864) that is supporting this question and falls under a good agreement level.According to statistical results that are reported in statement number 8, most of the teachers (84.1%) can search for animations that are relevant to their course and use them. It is also visible from the value of mean (M=3.97) and standard deviation (SD=.789) that is supporting this question and falls under a satisfactory agreement level.According to statistical results that are reported in statement number 9, most of the teachers (90.4%) can give lessons in class with the help of presentations (PowerPoint). It is also noticeable from the value of mean (M=4.12) and standard deviation (SD=.758) that is supporting this question and falls under a very good agreement level.According to statistical results that are reported in statement number 10, most of the teachers (94.5%) can search online for lesson-related videos to show students. It is also apparent from the figure of mean (M=4.17) and standard deviation (SD=.637) that is supporting this question and falls under a good agreement level.It is noticeable from the statistical results that are reported in statement 11, most of the teachers (86.2%) know how to use search engines well. The figures for mean (M = 4.03) and standard deviation (SD =.810) also support this question and fall within a good agreement level.According to statistical results that are reported in statement 12, most of the teachers (93.8%) know the use of social networking sites for educational purpose. The figures for mean (M = 4.26) and standard deviation (SD =.655) also support this question and fall within a good agreement level.According to statistical results that are reported in statement 13, most of the teachers (90.4%) are comfortable using ICT in their teaching. The figures for mean (M = 4.07) and standard deviation (SD =.731) also support this question and fall within a good agreement level. According to statistical results that are reported in statement 14, most of the teachers (91.8%) can use their Smart Phone to teach or learn, which makes them happy. The statistics for mean (M = 4.15) and standard deviation (SD =.738) also support this statement and fall within a good agreement level.According to statistical results that are reported instatement 15, most of the teachers (89.6%) can use YouTube videos in teaching, which makes them feel good. The figures for mean (M = 4.13) and standard deviation (SD =.850) also support this question and fall within a good agreement level.

Conclusion

The findings of the study show that most of the teachers are confident in digital instruction skills, having a high percentage ranging i.e., 83.5% to 94.5% are able to solve problems, can install software, type document, create web page, edit graphics, and integrate ICT and smartphones. This highlights their positive attitude towards digital technology and they proficient in ICT.

Future Recommendations

Teachers have a high level of ICT skills. Based on the findings of the current study, the following strategies must be adopted to improve digital proficiency and meet global needs:

- Sufficient infrastructure should be provided to integrate ICT in classrooms
- Training and Professional Development programs should include content and expertise related to ICT
- Virtual reality and artificial intelligence should be integrated to meet worldwide challenges

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