

## Study of Effects of ICT on Professional Development of Teachers at University Level

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### Abstract

Information and communication technology (ICT) has brought revolutionary changes to enhance professional development of teachers. At present several ICT related instructional devices like computers, smart phones, laptops, tablets, LCD, multimedia and projectors are used in classrooms for making more attractive and productive teaching and learning process. The objectives of the study were to explore perceptions of teachers regarding use of information communication technology and to find out the effects of ICT for improving teachers' professional development at university level. The study was descriptive type survey in nature. Simple random sampling technique was adopted for sample selection. All public and private educational institutions providing higher education of central Punjab were the population of the study. The sample of the study comprised of 90 faculty members, 120 students and 12 heads of different departments were selected on random basis. A self-developed questionnaire for faculty members, students and structured interview schedule for heads of departments were administered for collection of desired information. Data analysis was carried out by using percentage, mean score and standard deviation. The results of the study revealed that ICT has positive effects on enhancing professional development of teachers. It was found that university teachers were facing many difficulties in preparing their lectures with technological innovations and utilization of ICT in classrooms. The study recommended that ICT related refresher courses may be organized to improve professional development of academician.

**Keywords:** ICT, Professional Development, Effects, Higher Education,

### Introduction

Information and communication technology (ICT) plays leading role in training teachers to learn how they can enhance their pedagogical skills and content knowledge. Updated knowledge of ICT helps teachers to prepare their lesson plans to make teaching and learning effective. Cetin (2016) was of the opinion that teachers' use of ICT instructional devices in classrooms proves helpful to attract students' attention for enriching their knowledge. It was further revealed that frequently use of helps teachers to be more aware about their subject matter knowledge and also teaching students in better ways. Chai & Linkoh (2012) believed that induction of ICT instructional materials in education and training has reconstituted the methods of teaching and students' learning activities. OECD (2016) reported that proper use of advanced ICT devices like internet services (internet telephony, e-mail, instant messaging, chat), web-based services (social networks and online community services, news websites, e-commerce, online banking) and cloud computing services (software as a service, file storage, video streaming) in classrooms, workplaces and home can support in improving professional development of teachers and learning of students.

In this present era of science and technology, many changing are going on in the field of education and training of teachers. It is the need of time that teachers must be provided ICT training according to the global changing scenario (Ahmed, Munshi & Jamani, 2015). Professional development of

teachers equips teachers to learn updated knowledge and improve pedagogical skills to face challenges of classroom management. Omar (2014) was also in favour that better teachers are trained, they can educate better tomorrow's generation, because now their task is not confined to deliver a lecture on the subject but they also have to perform key responsibilities in educational institutions. Teachers must be equipped with modern technological innovations to meet the demands of globalization.

Information and communication technology (ICT) is a discipline comprised on modern computer technological software used in education and training for enhancing professional competency of teachers and learning capabilities of students. It is a branch of information technology responsible for retrieval, processing, creation and transfer instructional technological information (Wajszczyk, 2014). At present all the teaching, administrative and supporting staffs including students are using ICT facilities for successfully achieving educational objectives and are able to perform their routine activities in better ways. In classrooms, teachers use ICT related several instructional devices like computers, LCD, projectors, laptops, multimedia, smart phones etc. for improving students' learning (Bhattacharjee & Deb, 2016).

Teachers are the national builders responsible to train future generation to be able for facing challenges of present era, but this is not possible without having full command in utilization of ICT instructional devices properly. It is a fact that knowledge of ICT helps teachers to keep knowledge updated to use modern instructional technology in classrooms. Recently, ICT has become a basic need of human life across the world and no field can work effectively without its support. In education and training, it plays vital role to uplift teaching and learning process. The use of ICT facilities in teacher training programs has become necessary in classrooms and teachers are considering it most important pillar for better students' learning. Meta-analytic review of several research studies (Mills & Tincher, 2003) (Proctor, Watson & Finger, 2004) pointed out that need of further ICT training for teachers is the most important factor for improving professional competency in their subject matter knowledge (Russell, Dwyer, Bebell & Tao, 2007).

Uslu & Bumen (2012) believed that use of technology in education and training of teachers has become worldwide trend, as technological facilities in learning environments is playing leading role to make teaching and learning environment better. It is necessary for teachers to have updated technological integrated knowledge and skills for proper application of these instructional aids in classrooms. However, technology integration in education and training cannot be achieved overnight. It is the professional development which helps teachers to use ICT for making better teaching process and also support the students to enrich their knowledge. The use of ICT in training helps trainers to prepare their lesson plans better and deliver to students in classrooms in better ways.

Gebremeskel et al. (2016) were of the opinion that ICT helps in creation, acquisition, sharing, dissemination, transformation, support and recognition of knowledge, skills and provides access for improving students learning outcomes and enhancing professional competency of teachers. It is also proving fruitful tool for professional trainings of teachers in understanding to know how to use ICTs, the easier they can find their way to capture the newest methods for making attractive and productive teaching and students' outcomes. It facilitates in acquiring knowledge as teachers must be provided the basics of ICT for incorporating new technology and pedagogical skills to improve their teaching. It is a means of identifying students' learning desires, capabilities, outcomes (intellectual skills, cognitive strategies, verbal information motor skills and attitude) and methodology to be acquired by individuals. It is a paradigm technology for learning process makes a difference instruction.

Professional development helps teachers in seeking further knowledge and enhances their pedagogical skills they required for successful teaching and learning process. It has been observed one of the most important factors affecting teachers' integration of ICT in the classrooms. Teachers must be

provided professional development to improve their subject matter knowledge, skills and attitudes in order to educate students more effectively. But unfortunately, the manner in which they are trained not proving fruitful results due to very short durations of teacher training programs and other allied problems, trainees could not even understand ICT related basic instructional terminologies (Lawless & Pellegrino, 2007).

Availability of ICT instructional facilities to the teachers at tertiary level is not sufficient for meeting the demands of students, but there is a need of required training facilities for properly utilization of these teaching aids in classrooms. Oyaid (2009) and Sipila (2011) supported that frequency and level of teachers' utilization of computer technology in classroom is still at the early stages demands further training to overcome the difficulties faced to teachers in classrooms. Stephanie et al. (2012) also favoured that educational objectives of teaching and learning cannot be achieved successfully until teachers were not trained to have updated knowledge of ICT instructional aides to be properly used in classrooms.

Numerous research studies have pointed out the main factors that affect ICT integration in education and training. It included ICT infrastructure, access to ICT, available time, and curriculum flexibility seems to be most important requirements to be used in classrooms. Bristi (2014) revealed that teachers were aware of advantages of using ICT equipment for their professional development. It increases their knowledge about technologies involved in teaching and learning. They use internet for reading and writing articles, journals and websites and which helps in improving professional development of teachers. They were facing a number of problems like poor internet speed, high cost, lack of institutional support service, workload, lack of technological skills and lack of proper training. Teachers use internet for reading and writing articles, journals and websites which contributes to their professional development.

The quality of teachers is closely linked with the provision of updated professional training to be provided to them in due course of time. At present quality of teachers, teaching practices and teacher education and training are facing serious challenges needs to be overcome (Satya, 2015). Hennessy & London (2013) were of the opinion that presently teachers are facing challenges in classrooms due to lack of ICT professional and instructional skills. Hennessy & London (2013) were of the opinion that lack of time, lack of flexibility in curriculum and lack of access to ICT and supporting staff services. Tondeur, Cooper & Newhouse (2010) were in favour that ICT coordinator and school leadership can play vital role in the success of teachers' professional development. Sang et al (2010) pointed out main ICT barriers creating hindrances improving teachers' professional skills including lack of ICT resources and sustainability of the infrastructure, lack of teachers' ICT pedagogical skills and attitudes, finances for purchasing technology, lack of ICT teacher training, a lack of teachers' motivation. Cetin (2016) also claimed that lack of training, knowledge and skills necessary for proper use of ICT instructional technology in the classrooms was a major barrier for uplifting teaching and learning process. OECD (2016) reported that ICT have not yet been fully integrated in teaching and learning. Teachers do not have sufficient skills to use ICT in classrooms effectively.

ICT is a modern technological discipline and is considered necessary both for teachers and students because it helps to teachers to make teaching process easy and interesting for better students 'learning. It requires various skills and techniques to be used in classrooms for achieving students 'fruitful results. Teachers must know the use of ICT in their subject areas to help the learners for learning more effectively. So, the knowledge of ICT is very much essential for teachers to solve classroom management and students' academic problems. Keeping in view, this study was conducted to highlight need and importance of ICT both for university teachers and students for uplifting teaching and learning process.

### **Objective of the Study**

The objectives of the study were to explore perceptions of teachers regarding use of information communication technology and to find out effects of ICT for improving teachers' professional development at university level.

### **Research Questions**

1. Is ICT helpful to uplift teachers' professionalism?
2. Is ICT effects on delivery of instruction?
3. Is ICT effects on evaluation & assessment system for the effective teaching learning process?
4. What is the relationship between ICT and professional development of teachers?
5. What is the effect of ICT on professional development of teachers?

### **Methodology**

The study was descriptive in nature, so survey approach was used. All the faculty members, heads of department and students of public and private universities of province Punjab were the target population. There are nine divisions of Punjab and the researchers selected Sahiwal division due to easy approach. There are six Higher Education Commission (HEC) recognized campuses of different universities located in Sahiwal division. Fifteen faculty members, two heads of departments and twenty students taken as sample from each university campuses. So the total sample consisted of 90 faculty members, 120 students and 12 heads of different departments. A self-developed questionnaire for faculty members and students were administered through friends, colleagues and self-visit. The questionnaire consisted of 24 statements based on five point likert scale. The questionnaire was validated by educational experts and reliability was found as 0.79 before survey. A structured interview schedule for heads of departments was also developed and administered for data collection.

### **Results**

#### **Presentation and Analysis of Data**

**Research Question No. 1** Is ICT helpful to uplift teachers' professionalism?

**Table 1: Analysis of ICT helpful to uplift teachers' professionalism**

Statement	N	Respondents	Degree of Response					Mean	Std. Dev.	t value	Sig.
			SA%	A%	U%	DA%	SDA %				
ICT helpful to uplift teachers' professionalism	90	Faculty Members	32 35.5	20 22.2	17 18.9	13 14.4	8 8.9	3.622	1.354	4.055	.000
	120	Students	39 32.5	30 25	25 20.8	13 10.8	11 9.2	3.208	1.229		

Table 1 reflects that 57.7% faculty members agreed that ICT helpful to uplift teachers' professionalism while 23% disagreed with the statement, 18.9% remained undecided. The mean score 3.622 and standard deviation 1.35 values shows that ICT is useful to promote teachers' professionalism. The 57.5% students responded that ICT helpful to uplift teachers' professionalism and 20% disagreed with

the statement and 20.8% did undecided. The mean score and standard deviation value shows that ICT useful to promote teachers' professionalism. The t-value portrayed that ICT useful is to promote teachers' professionalism.

**Research Question No. 2** Is ICT effects on delivery of instruction?

**Table 2: Analysis of effects of ICT on delivery of instruction**

Statement	N	Respondents	Degree of Response					Mean	Std. Dev.	t value	Sig.
			SA%	A%	U%	DA%	SDA%				
ICT effects on delivery of instruction	90	Faculty Members	27 30	21 23.3	20 22.2	17 18.9	5 5.6	3.533	1.256	3.026	.003
	120	Students	37 30.8	35 29.2	22 18.3	20 16.7	6 5	3.325	1.231		

Table 2 shows that 53.3% faculty members were agreed that ICT effects on delivery of instruction and 24.5% disagreed with the statement, 18.9% remained undecided. The mean score 3.533 and standard deviation 1.2560 values shows that ICT effects on delivery of instruction. The 60% students agreed that ICT effects on delivery of instruction and 21.7% disagreed with the statement and 18.3% remained undecided. The mean score and standard deviation value shows that ICT effects on delivery of instruction. The t-value 3.026 clearly indicated that ICT effects on delivery of instruction significantly.

**Research Question No. 3** Is ICT effects on evaluation & assessment system for the effective teaching learning process?

**Table 3: Analysis of effects of ICT effects on evaluation & assessment system for the effective teaching learning process**

Statement	N	Respondents	Degree of Response					Mean	Std. Dev.	t value	Sig.
			SA%	A%	U%	DA%	SDA%				
ICT effects on evaluation & assessment system for the effective teaching learning process	90	Faculty Members	29 32.2	26 28.9	22 24.4	9 10	4 4.4	3.744	1.1472	4.447	.000
	120	Students	32 26.7	29 24.2	25 20.8	25 20.8	9 7.5	3.217	1.1166		

Table 3 shows that 61.1% faculty members agreed that ICT effects on evaluation and assessment system for the effective teaching learning process and 14.4% disagreed with the statement and 24.4% were remained neutral. The mean score was 3.744 and standard deviation value portrayed that ICT effects on evaluation and assessment system for the effective teaching learning process. The 51% students agreed that ICT effects on evaluation and assessment system for the effective teaching learning process, 20.8% remained undecided whereas 28.3% students disagreed with the statement. The mean score value and t-value also in favour that ICT effects on evaluation and assessment system significantly.

**Research Question No. 4** What is the effect of ICT on professional development of teachers?

**Table 4: Analysis of effects of ICT effects on professional development of teachers**

Statement	N	Respondents	Degree of Response					Mean	Std. Dev.	t value	Sig.
			SA%	A%	U%	DA%	SDA%				
ICT effects on professional development of teachers	90	Faculty Members	32 35.6	22 24.4	20 22.2	14 15.6	2 2.2	3.756	1.1642	4.180	.000
	120	Students	43 35.8	35 29.2	19 15.8	12 10	11 9.2	3.358	1.1137		

The table 4 reveals that 60% faculty members of the university showed positive response regarding ICT effects on professional development of teachers while 17.8% did not agree and 22.2% remained neutral. The 65% students showed responses in favour that ICT effects on professional development of teachers. The mean score and standard deviation values also put positive approach towards above statement. The t-value showed effect of ICT significantly.

**Research Question No. 5** What is the relationship between ICT and professional development of teachers?

**Table 5: Analysis of the relationship between ICT and professional development of teachers**

Statement	N	Respondents	Degree of Response					Mean	Std. Dev.	Pearson Value	Sig.
			SA%	A%	U%	DA%	SDA%				
ICT positively relates with professional development of teachers	90	Faculty Members	39 43.3	27 30	11 12.2	7 7.8	6 6.7	3.956	1.2170	0.741	.00
	120	Students	40 33.3	32 26.7	25 20.8	13 10.8	10 8.3	3.592	1.2264		

The majority (73.3%) teachers of university responded that ICT positively relates with professional development of teachers and 14.5% did not agree with the statement and 12.2% remained undecided. The majority (60%) students of university responded that ICT positively relates with professional development of teachers while 19.1% respond disagree. The mean and standard deviation values of both types of research participants portrayed that ICT positively relates with professional development. The Pearson value also showed strong relationship of ICT with professional development of teachers significantly (Table 5).

*Analysis of Interview Schedule of Heads of Department*

**Table 6. Opinions about the effects of ICT on Professional Development of Faculty Members**

Sr. No.	Opinions	Frequency	Percentages
1	• ICT affects teaching and learning process	4	33.33
	• ICT affects teaching and learning process very much	7	58.33
	• ICT does not affect teaching and learning process	1	8.33
2	• The performance of the students is easily accessed by using ICT	9	75
	• The performance of the students is not easily accessed by using ICT	3	25
3	• ICT affects delivery of instruction	5	41.66
	• ICT effects on delivery of instruction very much	6	50
	• ICT does not affect the delivery of instruction	1	8.33
4	• ICT helpful in enhancing professional development of teachers	10	83.33
	• ICT does not helpful in enhancing professional development of teachers	2	16.66
5	• ICT positively relates with professional development of teachers	10	83.33
	• ICT does not relate with professional development of teachers	1	8.33
	• No comments about professional development of teachers and ICT	1	8.33

The majority (91.67%) of educational administrators responded that ICT affects teaching and learning process while 8.33% was not in favour this statement. The 75% participants responded that the performance of the students is easily accessed by using ICT whereas 25% respond that the performance of the students is not easily accessed by using ICT. The majority (91.66%) participants responded that ICT effects on delivery of instruction while 8.3% were did not agree with the statement. ICT helpful in enhancing professional development of teachers responded by 83.33% and 16.66% respond that ICT was not promoting professional development of teachers. The majority 83.33% educational managers responded that ICT positively relates with professional development

of teachers and 8.33% were disagreed, 8.33% respondents give no comments about relation of ICT and professional development of teachers of the university.

### **Discussion and Conclusion**

Teachers are considered main beneficiaries in achieving up to mark students' outcomes by proper utilization of ICT instructional facilities in classrooms, but this requires updated training and technological proficiency. Many studies had shown very alarming results recommending updated ICT professional instructional training to be provided to teachers for facing the challenges of present era. Sahito & Vaisanen (2017) revealed that perception of the majority (85%) of the responses was agreed regarding use of ICT in improving professional development of teachers. It was also found that updated ICT instruments like software and hardware instructional resources are needed for further uplifting teacher training programs and very helpful at all stages of teaching and students' learning. Ahmed (2016) described that use of ICT devices in professional trainings improves pedagogical skills of teachers. Wajszczyk (2014) revealed that positive impact of ICT on students' learning was noticed.

Information and communication technology (ICT) has brought fundamental change in enhancing professional development of teachers and improving students' learning. Teachers frequently used several ICT related instructional devices like computers, smart phones, laptops, tablets, LCD, multimedia and projectors in classrooms for making more attractive and productive teaching and learning process. Today, education is proving a very socially oriented activity and quality of teachers has become strongly associated with the provision of high degree professional training regularly. But with global changes, the world is moving rapidly into digital media and information, the role of teachers is going to over expected by the world community. Teachers are supposed to have advanced level of ICT knowledge and professional skills to be utilized in class rooms for meeting the demands of present scenario.

The results of this study revealed that information and communication technology helpful to uplift teachers' professionalism. ICT effects on delivery of instruction, evaluation and assessment system for the effective teaching learning process and on professional development of teachers. The study concluded that ICT has positive relationship with professional development of teachers. The present study recommended that ICT based refresher courses may be conducted for improving professional development of faculty members of the universities.

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