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Role of Information Technology in Professional Development During COVID-19 – A Study with Reference to the Holistic Approach

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ABSTRACT

Evolving situations in all sectors call for the need to embrace innovative changes, and teaching is no exception. Changes by themselves do not ensure permanence, as evidenced by the significant shifts in teaching and learning strategies brought about by the recent deadly outbreak. From those educated in the 1970s to millennials, educators are compelled to transition from traditional blackboard teaching to advanced blended and collaborative teaching methods. In this context, it is crucial for teachers in higher education institutions to study the significance of information technology (IT) in developing their profession and to understand the extent to which they can adapt to modern technologies in teaching. This study takes a holistic approach to examine teachers' knowledge, pedagogical practices, and their evolving attitudes as a result of professional development. It also analyses the impact of technology on their professional growth. The purposive sampling technique was employed for this. Both basic descriptive analysis and a structural equation model were employed to investigate the proposed model.

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1.0 INTRODUCTION

US Department of Education, in 1999, highlighted the significance of integrating technology into the process of teaching and learning (Voogt & Knezek, 2008). Insufficient access to technology (Drent & Meelissen, 2008; Agyei & Voogt, 2011; Tondeur *et al.,* 2012), a lack of workshops or courses to provide teacher educators with Information and Communication Technology (ICT) skills (Wentworth & Middleton, 2014), and a lack of technical support (Matthew *et al.,* 2002) have all been

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identified as factors that prevent higher education teachers from successfully incorporating technology into their instruction. However, to help teachers learn about the most recent advancements in teaching techniques and professional requirements, numerous higher education institutions, including universities, teacher training colleges, and colleges, started holding webinars, faculty development programs (FDPs), workshops, and other similar events during the pandemic.

Professional development should adopt a holistic approach. Early research on child education highlights the importance of factors related to feelings, skills, knowledge, and predisposition, and this applies to teachers' professional development as well. To study the effect of IT on the professional development of higher education teachers, the researchers have adopted the whole-teacher approach proposed by Chen and Chang (2006). This approach takes into account a number of factors, including classroom practices and teaching methods (encouraging students to explore software, pairing more competent students with less competent ones, using the computer as a learning resource, and incorporating the use of software in planning activities), knowledge and skills (comfort with computer functions and commands, training in selecting appropriate software, capacity to learn new software, installing new programs independently), and attitude (confidence in using a computer or laptop in the classroom, comfort with using the internet, and teaching students how to use computers) (Chen & Chang, 2006).

1.1 Review of Literature

Faculties in higher education need to update and develop their professional skills by participating in Faculty Development Programmes (FDPs), workshops, webinars, seminars, conferences, symposiums, and similar events to be considered continuous learners (Lidof & Pasco, 2020). Advances in technology have propelled us into a digital world where many activities are conducted online (Mauss, 1990). However, there exists a question of whether online instruction (Agyei & Voogt, 2011) or traditional formal education (Drent & Meelissen, 2008) is more beneficial in the classroom.

Most studies suggest that a blended mode of teaching is beneficial, as it helps both teachers and students gain in-depth knowledge more easily (King, 2002). Higher education teachers' varying levels of understanding regarding technological development in teaching are addressed by a number of proposed models, including the four stages (Emerging, Applying, Infusing, and Transforming) of Anderson and Van Weert's model (Esterhuizen *et al.,* 2013), the three levels (Entry, Adaptation, and Transformation) (Seels *et al.,* 2003; Coughlin & Lemke, 1999), the TPACK (Technological, Pedagogical, and Content Knowledge) framework (Harris *et al.,* 2010; Mishra & Koehler, 2006; Koehler & Mishra, 2005), and the SAMR (Substitution, Augmentation, Modification, Redefinition) Model of Technology Integration (Psiropoulos *et al.,* 2016).

These models highlight a research gap: there has been limited research on the role of IT in promoting professional development among higher education teachers with a holistic approach. This study aims to develop a model to address this gap. The objective of the research is to study the mediating effect of ICT on the relationship between Factors of the Holistic Approach to Teaching (Attitude, Skill and Knowledge and Classroom Practice) and Professional and Skill Development.

2.0 RESEARCH METHODOLOGY

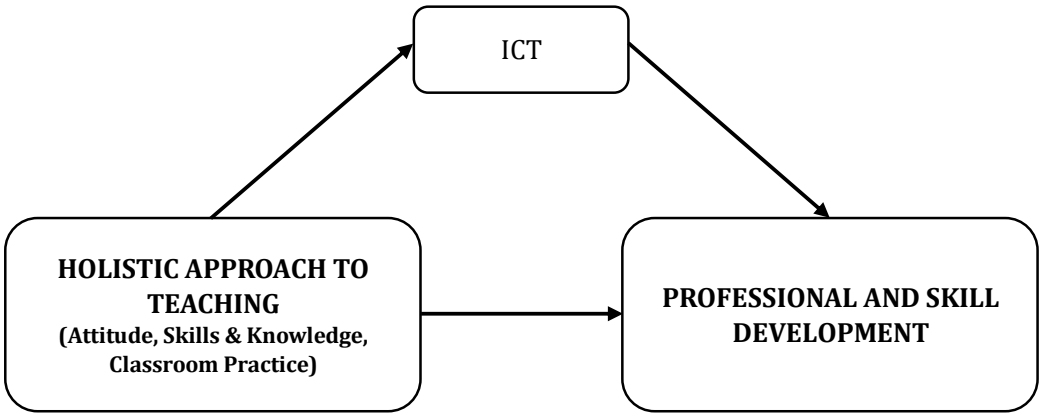
The present study is based on a purposive sampling method. Data was collected from 217 teachers from higher educational institutions in Chennai. The factors considered for this study have

been derived from previous research conducted in this area. The questionnaire was adapted from the research by Forhad (2018), Hakkarainen *et al.* (2001) and Soe (2018). A standardised questionnaire was used for data collection. The reliability of the questionnaire was found to be 0.978. A 5-point Likert scale was used to under the perception of the respondents. Data collected was analysed using SPSS.

2.1 Research Model

Figure 1

Holistic Teaching Approach – ICT Development Model



3.0 ANALYSIS AND INTERPRETATION

In order to achieve this, the researchers have considered a number of factors, including teachers' attitudes toward using technology in the classroom, their IT knowledge and proficiency, new developments in teaching strategies, classroom IT practices, and their professional development during the COVID-19 pandemic using technology.

3.1 Demographic Details of the Study Respondents

Table 1

Frequency Distribution of Demographic Factors Related to Higher Education Teachers

Factors	Frequency	Percentage
Gender		
Male	117	53.9
Female	100	46.1
Age Group *(in years)*		
Below 25	39	18.0
25-29	31	14.3
30-39	42	19.4
40-49	38	17.5
50-59	32	14.7
Above 60	35	16.1

Employment Status		
Full-Time	78	35.9
Part-Time (50-90% of full-time hours)	73	33.6
Part-Time (less than 50% of full-time hours)	66	30.4
Employment Status as a faculty of this college		
Permanent	111	51.2
Temporary	106	48.8
Education		
Post Graduate with NET/SET	57	26.3
M.Phil. and NET/SET	49	22.6
Ph.D.	51	23.5
Ph.D. and NET/SET	60	27.6
Duration of Employment		
Less than 1 year	24	11.1
1-5 years	51	23.5
5-10 years	57	26.3
10-15 years	40	18.4
More than 15 years	45	20.7

Source: Primary Data

Table 1 presents the demographic factors of higher education teachers. The majority of male teachers (53.9%) fall into the age group of 30-39 years (19.4%) and are employed full-time (35.9%) in permanent positions (51.2%). They hold educational qualifications of a Ph.D. along with NET/SET (27.6%) and have been working at their current institution for 5-10 years (26.3%).

All respondents answered yes to the question of having attended any professional development courses in the past 18 months. This indicates that the teachers are actively engaged in professional and skill development.

3.2 Mediating Effect

Teachers were forced to switch from traditional classroom instruction to digital instruction due to the unexpected pandemic (Lockee, 2021). Consequently, teachers had to rely on resources that support both educators and learners, develop skills for remote teaching, and enhance their capacity to support online teaching and learning (Reimers *et al.,* 2020). This situation underscored the growing importance of platforms like Google Meet, Webex, Zoom, and Google Classroom. In this context, it is crucial to understand the role of information technology in achieving necessary professional development while considering a holistic approach to teaching. The Sobel test was used to determine how ICT mediates professional development. Factors including attitudes toward teaching with information technology, knowledge and abilities linked to teaching with IT, and IT-related classroom practices are all part of the holistic approach to teaching in higher education.

SPSS was used to identify the total effect of the independent variable holistic approach to teaching (X) on the dependent variable professional and skill development (Y). From *Table 2*, it can be seen that X has a 63.5% impact on Y. The analysis of ANOVA and coefficients shows significance at a 1% level.

Table 2

Model Summary of Total Effect of X on Y

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.797	.635	.632	.51888

Table 3

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.580	1	56.580	210.147	.000
	Residual	32.578	121	.269		
	Total	89.159	122			

Table 4

Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	*Std. Error*	*Beta*		
1	(Constant)	.510	.235		2.173	.032
	HOLISTIC	.868	.060	.797	14.496	.000

After identifying the total effect of X on Y, regression analysis was undertaken to identify the direct effect of the independent variable on the mediating variable ICT (M). On analysing Table 5*,* Table 6 *and*

Table 7, it can be seen that the direct effect of X on M is 67.2%, significant at the 1% level.

Table 5

Model Summary of Direct Effect of X on M

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.820	.672	.669	.51648

Table 6

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.

	Regression	66.020	1	66.020	247.498	.000
1	Residual	32.277	121	.267		
	Total	98.297	122			

Table 7

Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	*Std. Error*	*Beta*		
1	(Constant)	.275	.233		1.178	.241
	HOLISTIC	.938	.060	.820	15.732	.000

Regression analysis was also undertaken to study the direct effect of independent and mediating variables on the dependent variable. X and M had a 66.5% impact on Y, which was significant at the 1% level.

Table 8

Model Summary of Direct Effect of X and M on Y

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.816	.665	.660	.49855

Table 9

ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
	Regression	59.332	2	29.666	119.355	.000
1	Residual	29.826	120	.249		
	Total	89.159	122			

Table 10

Coefficients

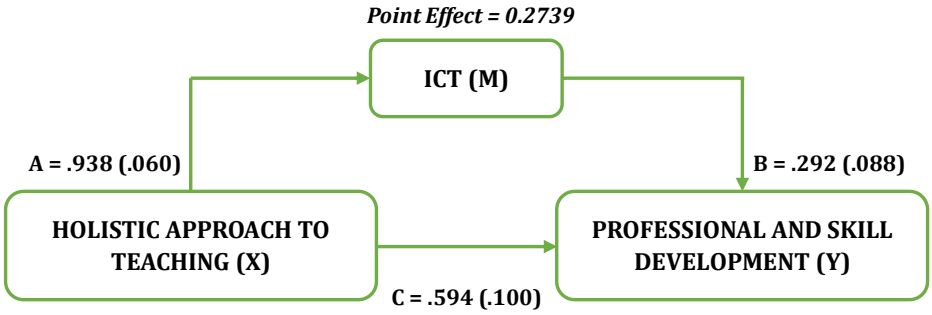
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	*Std. Error*	*Beta*		
	(Constant)	.429	.227		1.894	.061
1	HOLISTIC	.594	.100	.545	5.919	.000
	ICT	.292	.088	.307	3.327	.001

Dependent Variable: PSD

Later, Sobel's test was administered to study the mediating effect of M on X and Y.

Figure 2

Results of Sobel Test



Based on the results of the Sobel test, the test statistic is **3.24587352** with a standard error of **0.08438283** significant with a p-value of **0.00117091**. The crucial parameter is the p-value, which is less than 0.05. It shows that the indirect effect between Factors of the Holistic Approach to Teaching (Attitude, Skill and Knowledge, and Classroom Practice) and Professional and Skill Development via ICT is statistically significant. The point estimate of this indirect effect at which the p-value is statistically significant is calculated as the product of unstandardised coefficients beta for A (X to M) and B (M to Y).

Point Estimate = 0.938 x 0.292 = 0.2739

This point estimate value of 0.2739 estimates the indirect effect between Factors of the Holistic Approach to Teaching (Attitude, Skill and Knowledge, and Classroom Practice) and Professional and Skill Development through ICT at the p-value of 0.00117091, as shown in the Sobel Test.

The outcome of the study confirms that the adoption of ICT tools by teachers working in higher education institutions intervenes in their holistic approach to teaching and professional and skill development. The teachers have to equip themselves by adapting to the changing dynamics of teaching. Their attitude, skills, and practices regarding the use of ICT showcase their willingness to engage in lifelong learning. It will help them to embrace new pedagogical practices and improve inquisitiveness and active learning, leading to professional success through skill development.

4.0 CONCLUSION

The emergency challenges posed by the pandemic have prompted educational institutions to adopt ICT. The period following the pandemic will likely continue to favour a blended mode of teaching and learning. However, this shift requires extensive training to adapt to changing technology and acquire the necessary skills. Along with their pedagogical and subject-matter expertise, teachers also need to be proficient and skilled in online instruction. This situation underscores the need for educational institutions to recognise ICT as a bottom-up process crucial for ensuring the professional and skill development of teachers. To expand the body of knowledge in this field, further research might be done on the barriers that instructors face while implementing ICT tools and approaches in their pedagogy.

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