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Relationship Between Digital Competence And Pedagogical Management Of School Teachers

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ABSTRACT

The paper deals with the study to investigate the level of correlation existing between **Digital Competence** and **Pedagogical Management** noticed among school teachers. For the study undertaken a sample size of 100 school teachers were randomly chosen from different schools in the district of Thiruvallur. Adopting a descriptive research study method, the investigation was done with the aim to explore the relationship between variables - Digital Competence (independent variable) & the Pedagogical Management (dependent variable). The variables in regard to demography were - **01**. **Gender (Male & Female) 02**. **Qualification (B.Ed. & M.Ed.) and 03**. **Subjects taught were (Arts & Science).** For the research study the tool **'Digital Competence Assessment'** developed by Dr. G. Jemima, was utilized together with the **Pedagogical Management Questionnaire,** constructed and also validated for study by the researcher her-self with the help of the Research Guide. The findings revealed not only a positive relationship between the independent and dependent variables, but also the relationship was observed to be significant between the two variables - Digital Competence and Pedagogical Management - noticed among school teachers

Keywords: Digital Competence, Pedagogical Management, School Teachers

Introduction

The digital transformation of society can be seen now as a hard reality and it has become the essential part of everyone's everyday life. More especially, the children grow up in the dominant level of digital age. As an obvious need, the educational systems are having to adopt the commands of the digital landscape in order to actively engage students for preparing them for the future lives. Teachers need to be digitally competent in an advanced manner. They need to effectively use digital tools and the corresponding technologies in the teaching processes and practices. They include digital literacy, familiarity with education-friendly software and the platforms thereof. Their ability to integrate information with communications using technologies, seamlessly, is essential for the educational activities. Pedagogy has to be in connect with the educational processes helping the teachers to perform effective roles. According to, Jay (2023) & Ewing (2005) pedagogy works to integrate the teachers' activities with learner interactions, curricula, and the policies of education. (**Ref.01 & 02).** Competence in Pedagogy thus includes understanding different teaching methodologies and strategies in the process of delivering educational content effectively (Barnett & Hodson, 2001; Wang, 2016). (**Ref.03 & 04)**. The process therefore involves knowledge of teaching and learning practices, classroom management, planning of the lessons and assessment and evaluation of the student. Teachers with high level of pedagogical competence understand well as to how the students learn and could accordingly adapt their teaching methods to the varying needs.

Knowledge about the theories of cognitive, social, and developmental learning aspects is therefore very essential for teaching effectively (Koehler & Mishra, 2009; Twiselton, 2004) (**Ref.05 & 06).** Many times, the technological competencies of the teachers include their ability to use ICT tools, from simple items to advanced technologies - the Internet and educational software (Schmidt et al., 2009; Ventayen, 2019) (**Ref.07 & 08)**. The educators have a definite need to understand their subjects, and also how effectively they could use technology to achieve the teaching goals. professional ability of the self, the age, educational background, and their attitudes towards technology, to a large extent, influence the way the teachers integrate technology for delivering their lessons. Research studies support that the teachers' technical skills are highly beneficial for their lesson planning and their activities in the classroom (Foulger et al., 2017; Judson, 2006; Norris et al., 2003; Sugar et al., 2004; Zhu et al., 2013). (**Ref.09)**

Dimensions of Digital Competence

According to Ramkrishna (2017) (**Ref.10)** there are five dimensions of the teacher's digital competence. They are digital practice knowledge, proficiency with digital technology for education, assessment and authorization of online content, management and communication of digital data, and collaboration and sharing of digital tools for education.

- Digital Practice Knowledge: This dimension is about the teachers' right understanding as to how digital tools and resources could be integrated effectively and put into educational practices. It covers knowledge about various digital platforms, relevance of applications, and the pedagogical strategies that help enhance the processes of teaching and learning.
- Proficiency of Digital Technology relevant to Education: Teachers need to be proficient in putting effective use of different digital technologies particularly designed for educational purposes. It includes being familiar with learning management systems available (LMS), adoptable educational software, and the multimedia tools that effectively facilitate instruction.
- Assessment and Authorization of Online Content: Due to vast amount of information being available online, teachers would need the right skills to be able to critically assess and be able to authorize the digital content. This dimension has emphasis on the ability to be able to evaluate the authenticity / credibility, reliability, and relevance of the available online resources before actually incorporating the same into teaching process.
- Management and Communication of Digital Data: This dimension is focused on the effective organization, skillful management, and the communication of digital data applicable to educational context. Teachers must be highly competent in managing student data, in maintaining records, and also ensuring that the sensitive information is securely and ethically handled.
- Collaboration and Sharing of Digital Resources for Education: Teachers are motivated and encouraged to effectively collaborate in sharing digital resources among their colleagues and students. The dimension here highlights the essentiality of teamwork and also the collective ability of using the technology to actively enhance educational outcomes.

Dimensions of Pedagogical Management

Voss, Kunter and Baumert (2011) (**Ref.11)** came out with the model of general pedagogical knowledge which combines the essential aspects of pedagogy and psychology to suit the social environment prevailing in the classroom and the heterogeneity of individual student's ability to learn. The model of "general pedagogical / psychological knowledge" comprises four sub-dimensions:

- **Knowledge of classroom management** (maximising the time for instructional needs by having right awareness of what is going on in different parts of the classroom, while handling two or more classroom events at the given time, maintaining the steady pace of teaching throughout the lesson carrying out the needed momentum, with a clear direction in lessons and keeping together the entire group of students live to the happenings)
- **Knowledge of teaching methods** (Using the instructional time productively by being able to have a command of various teaching methods [e.g. direct instruction, discovery learning, etc.] and being aware

when and how to put to use each method in the promotion of the student's involvement in the concepts and the learning tasks)

- **Knowledge of classroom assessment** (having knowledge of different forms and purposes of assessments - formative and summative, and knowledge about how different frames of reference [e.g. social, individual, criterion-based] have impact on students' motivation)
- **Knowledge of learning processes** (lending support and to foster individual ability to progress in learning, having knowledge of different cognitive and motivational processes of learning which include the learning strategies, impact of background knowledge, memory and processing of information, causal attributes and how they help fostering 'student engagement', the effects and qualitative characteristics of praise, and providing of opportunities enabling increased student engagement)

Significance of Study:

Educators' digital skills are the ability to select appropriate technologies for effectively handling the learning processes and being able to relate them to the educational content and the goals, thereby transforming technologies into effective supporting tools to promote in turning out enhanced learning outcomes and achievements. Teacher education therefore has to necessarily consider digital aspects in pedagogy that trains them in planning and implementing technologically aided and supported learning process. [Lange, C.; Costley, J.2020]. (**Ref. 12**) Teachers' digital competences cover the knowledge, skills, and the attitudes that the teachers need for integrating technology into the teaching practices that they do. The teachers' high-level digital competence is defined by the ability of them to use digital devices, software applications, and the online platforms to be able to access, assess, create, and transfer useful and relevant information and knowledge, such that it improves educational outcomes and prepares students to effectively acquaint the digital world. The objective of this research study is to ascertain how the digital competence is related to pedagogical management of the school teachers.

Objectives of the Study:

1. To study & determine the correlation between Digital Competence and Pedagogical Management of **School Teachers**.
2. To study & determine the correlation between Digital Competence and Pedagogical Management of **Male Teachers**.
3. To study & determine the correlation between Digital Competence and Pedagogical Management of **Female Teachers**.
4. To study & determine the correlation between Digital Competence and Pedagogical Management of **B. Ed qualified Teachers.**
5. To study & determine the correlation between Digital Competence and Pedagogical Management of **M. Ed qualified Teachers.**
6. To study & determine the correlation between Digital Competence and Pedagogical Management of **Arts subject Teachers.**
7. To study & determine the correlation between Digital Competence and Pedagogical Management of **Science subject Teachers.**
8. To study & determine whether the difference is significant between **Male and Female teachers** in Digital Competence
9. To study & determine whether the difference is significant between **Male and Female teachers** in Pedagogical Management
10. To study & determine whether the difference is significant between **B. Ed and M. Ed qualified teachers** in **Digital Competence.**
11. To study & determine whether the difference is significant between B.Ed and M.Ed qualified teachers in **Pedagogical Management.**
12. To study & determine whether the difference is significant between Arts and Science subject teachers in **Digital Competence.**

13. To study & determine whether the difference is significant between Arts and Science subject teachers in **Pedagogical Management.**
14. To study whether there is significant effect of **Digital Competence on Pedagogical Management.**

Variable of the Study:

Independent Variable: Digital Competence
Dependent Variable: Pedagogical Management

Hypotheses of the Study:

15. H1: There is no correlation between Digital Competence and Pedagogical Management of School Teachers.
16. H2: There is no correlation between Digital Competence and Pedagogical Management of Male Teachers.
17. H3: There is no correlation between Digital Competence and Pedagogical Management of Female Teachers.
18. H4: There is no correlation between Digital Competence and Pedagogical Management of B. Ed qualified Teachers.
19. H5: There is no correlation between Digital Competence and Pedagogical Management of M. Ed qualified Teachers.
20. H6: There is no correlation between Digital Competence and Pedagogical Management of Arts subject Teachers.
21. H7: There is no correlation between Digital Competence and Pedagogical Management of Science subject Teachers.
22. H8: There is no significant difference between Male and Female teachers in Digital Competence
23. H9: There is no significant difference between Male and Female teachers in Pedagogical Management
24. H10: There is no significant difference between B. Ed and M. Ed qualified teachers in Digital Competence
25. H11: There is no significant difference between B. Ed and M. Ed qualified teachers in Pedagogical Management
26. H12: There is no significant difference between Arts and Science subject teachers in Digital Competence.
27. H13: There is no significant difference between Arts and Science subject teachers in Pedagogical Management.
28. H14: There is no significant effect of Digital Competence on Pedagogical Management.

Methodology:

The descriptive research method has been chosen for the study aimed to explore the relationship between the **independent variable (Digital Competence)** and the **dependent variable (Pedagogical Management)**. The demographic variables considered in the analysis included: 1) Gender (Male/Female), 2) Qualification (B. Ed/M. Ed), and 3) Subjects Taught (Arts/Science).

Sampling:

Random sampling technique has been chosen for the study and a total number of 100 school teachers were selected randomly from different schools in Thiruvallur district, as sample for the research study.

Tools Used:

The following tools were used for data collection to check & verify the hypothesis in the study taken up:

1. **The Digital Competence Questionnaire** developed by Dr. G. Jemima, (reliability 0.79 & Validity r = 0.89)

2. **Pedagogical Management questionnaire** constructed and validated by the researcher. (reliability 0.980 & validity r = 0.99). The response categories for worded items were (4 = Always, 3 = often, 2 = sometimes and 1 = never).

Statistical Techniques used for the Analysis of Data:

- The statistical techniques adopted and used for the analysis of data collected were mean, **Standard deviation, Pearson Product moment coefficient of correlation**, **linear regression** and **'t' value.**

Results & Discussion

Hypothesis No.1:

"There is no significant relationship between Digital Competence and Pedagogical management of School teachers."

TABLE 1 shows the Result in regard to the relationship between Digital Competence and Pedagogical Management of School Teachers.

S.No	Variables	N	r value	P
1	Digital Competence	100	0.262	0.009
2	Pedagogical Management			

It is revealed from the results above that the significance level is 0.009, which is significant in relationship between **Digital Competence** and **Pedagogical Management of School Teachers**, hence, Hypothesis No.1 is rejected. **There is a significant relationship between Digital Competence and Pedagogical Management of School Teachers.**

Hypothesis No.2:

'There is no significant relationship between Digital Competence and Pedagogical Management of Male teachers.

TABLE 2 shows the Result in regard to the relationship between Digital Competence and Pedagogical Management of Male teachers.

S.No	Variable	N	r value	P
1	Digital Competence	31	0.459	0.009
2	Pedagogical Management			

It is revealed from the above that the significance level is 0.009, and it shows that there is a significant relationship between Digital Competence and Pedagogical Management of Male teachers, hence, Hypothesis No.2 is rejected. **There is a significant relationship between Digital Competence and Pedagogical Management of Male Teachers.**

HYPOTHESIS NO.3

'There is no significant relationship Digital Competence and Pedagogical Management of Female Teachers.

TABLE 3 shows the Result in regard to the relationship between Digital Competence and Pedagogical Management of Female Teachers.

S. No	Variable	N	r value	P
1	Digital Competence	69	0.289	0.016
2	Pedagogical Management			

It is revealed from the above that the significance level is 0.016, and it shows that there is a significant relationship between Digital Competence and Pedagogical Management of Female teachers, hence, Hypothesis No.3 is rejected. **There is a significant relationship between Digital Competence and Pedagogical Management of Female Teachers.**

HYPOTHESIS NO.4

'There is no significant relationship between Digital Competence and Pedagogical Management of B. Ed Teachers.

TABLE 4 shows the Result in regard to the relationship between Digital Competence and Pedagogical Management of B. Ed qualified Teachers.

S. No	Variable	N	r value	P
1	Digital Competence	62	0.362	0.004
2	Pedagogical Management			

It is revealed that the significance level is 0.004, which shows that there is a significant relationship between Digital Competence and Pedagogical Management of B. Ed Teachers, hence, Hypothesis No.4 is rejected. **There is a significant relationship between Digital Competence and Pedagogical Management of B. Ed qualified teachers.**

HYPOTHESIS NO.5

'There is no significant relationship Digital Competence and Pedagogical Management of M. Ed qualified teachers.

TABLE 5 shows the Results in regard to the relationship between Digital Competence and Pedagogical Management of M. Ed qualified teachers.

S. No	Variable	N	r value	P
1	Digital Competence	38	0.409	0.011
2	Pedagogical Management			

It is revealed that the significance level is 0.011, which shows that there is a significant relationship between Digital Competence and Pedagogical Management of M. Ed qualified teachers, hence, Hypothesis No.5 is rejected. **There is a significant relationship between Digital Competence and Pedagogical Management of M. Ed qualified teachers.**

HYPOTHESIS NO.6

'There is no significant relationship between Digital Competence and Pedagogical management of Arts subject teachers.

TABLE 6 shows the Result in regard to the relationship between Digital Competence and Pedagogical Management of Arts subject teachers.

S. No	Variable	N	r value	P
1	Digital Competence	43	0.370	0.012
2	Pedagogical Management			

It is revealed that the significance level is 0.012, which shows that there is a significant relationship between Digital Competence and Pedagogical Management of Arts subject teachers, hence, Hypothesis No.6 is rejected. **There is a significant relationship between Digital Competence and Pedagogical Management of Arts subject teachers.**

HYPOTHESIS NO.7

'There is no significant relationship between Digital Competence and Pedagogical Management of Science subject teachers.

TABLE 7 shows the Result in regard to the relationship between Digital Competence and Pedagogical Management of Science group Teachers.

S. No	Variable	N	r value	P
1	Digital Competence	57	0.300	0.024
2	Pedagogical Management			

It is revealed that the significance level is 0.024, which shows that there is a significant relationship between Digital Competence and Pedagogical Management of Science subject teachers, hence Hypothesis No.7 is rejected. **There is a significant relationship between Digital Competence and Pedagogical Management of Science subject teachers.**

HYPOTHESIS NO.8

"There is no significant difference between Male and Female teachers in Digital Competence''

TABLE 8 shows the Result in regard to the difference between Male and Female teachers in Digital Competence''

S. No	N	Gender	Mean	Std. Deviation	t value	P
1	31	Male	108	6.02	0.626	NS
2	69	Female	107	6.08		

It is revealed that the calculated value is less than the table value (1.96) hence it is not significant, null hypothesis is accepted, hence, Hypothesis No.8 is accepted. **There is no significant difference between Male and Female teachers in Digital Competence.**

HYPOTHESIS NO.9

"There is no significant difference between Male and Female teachers in Pedagogical Management''

TABLE 9 shows the Result in regard to the difference between Male and Female teachers in Pedagogical Management''

S. No	N	Gender	Mean	Std. Deviation	t value	P
1	31	Male	107	5.30	-1.03	NS
2	69	Female	109	6.71		

From the table No.9, it is revealed that the calculated value is less than the table value (1.96) it is not significant, hence the null hypothesis is accepted, and the Hypothesis No.9 is accepted.
There is no significant difference between Male and Female teachers in Pedagogical Management.

HYPOTHESIS NO.10

"There is no significant difference between B. Ed and M. Ed qualified teachers in Digital Competence''
TABLE 10 shows the Result in regard to the difference between B. Ed and M. Ed qualified teachers in Digital Competence''

S. No	N	Qualification	Mean	Std. Deviation	t value	P
1	62	B. Ed	108	6.38	0.718	NS
2	38	M. Ed	107	5.50		

From the table No.10 it is revealed that the calculated value is less than the table value (1.96) hence it is not significant and the null hypothesis is accepted. Hypothesis No.10 is therefore accepted. **There is no significant difference between B. Ed and M. Ed qualified teachers in Digital Competence.**

HYPOTHESIS NO.11
"There is no significant difference between B. Ed and M. Ed qualified teachers in Pedagogical Management''

TABLE 11 shows the Result in regard to the difference between B. Ed and M. Ed qualified teachers in Pedagogical Management''

S. No	N	Qualification	Mean	Std. Deviation	t value	P
1	62	B. Ed	108	5.81	-1.65	NS
2	38	M. Ed	110	6.84		

From the table No.11 it is revealed that the calculated value is less than the table value (1.96) hence it is not significant, null hypothesis is therefore accepted. Hypothesis No.11 is accepted. **There is no significant difference between B. Ed and M. Ed qualified teachers in Pedagogical Management.**

HYPOTHESIS NO.12
"There is no significant difference between Arts and Science teachers in Digital Competence''

TABLE 12 shows the Result in regard to the difference between Arts and Science teachers in Digital Competence''

S. No	N	Subject	Mean	Std. Deviation	t value	P
1	43	Arts	109	6.13	2.40	0.018 S
2	57	Science	106	5.73		

From the table No.11 it is revealed that there is a statistically significant difference between the scores of Arts and Science teachers, with Arts teachers scoring slightly higher on the measured variable (mean of 109 vs. 106 for Science teachers). The difference is meaningful based on the t-test result ($t = 2.40$, $p < 0.05$). Hence, Hypothesis No.11 is rejected.

There is significant difference between Arts and Science teachers in Digital Competence.

HYPOTHESIS NO.13

"There is no significant difference between Arts and Science teachers in Pedagogical Management''

TABLE 13 shows the Result in regard to the difference between Arts and Science teachers in Pedagogical Management

S. No	N	Subject	Mean	Std. Deviation	t value	P
1	43	Arts	107	5.05	-1.98	NS
2	57	Science	109	6.97		

From the table No.13 it is revealed that the calculated value is less than the table value (1.96), hence it is not significant, null hypothesis is therefore accepted, Hence, Hypothesis No.13 is accepted.

There is no significant difference between Arts and Science teachers in Digital Competence.

HYPOTHESIS NO.14

There is no significant effect of Digital Competence on Pedagogical Management.

TABLE 14 shows the Result in regard to the effect of **Digital Competence** on **Pedagogical Management.**

Predictor	Estimate	SE	t-value	p-value
Constant	79.057	79.057	7.21	< 0.001
Digital Competence	0.273	0.102	2.68	0.009

From the table No.13 it is revealed that, the intercept is statistically significant ($p < 0.001$). Digital Competence is also statistically significant ($p = 0.009$), indicating that an increase in Digital Competence positively affects Pedagogical Management scores, so null hypothesis is rejected. Hypothesis No.13 is rejected.

It is found from the study that there is a significant impact of **Digital Competence** on **Pedagogical Management**. The statistical analysis of the study shows that Digital Competence is a significant positive predictor of the skill in Pedagogical Management in school teachers. It is also corroborated that any level of increase in the Digital Competence in teachers would normally be associated with corresponding increase in the levels of Pedagogical Management scores. Further, the results showed notable significance, which indicates a meaningful baseline score for Pedagogical Management skill could be seen when Digital Competence is at zero level. This model hence strongly suggests that any improvement in the digital competencies is supposed to lead to enhanced

pedagogical management practices - subject to the variables being akin to the parameters chosen for this study.

Findings

29. There is significant correlation between Digital Competence and Pedagogical Management of School Teachers.
30. There is significant correlation between Digital Competence and Pedagogical Management of Male Teachers.
31. There is significant correlation between Digital Competence and Pedagogical Management of Female Teachers.
32. There is significant correlation between Digital Competence and Pedagogical Management of B. Ed qualified Teachers.
33. There is significant correlation between Digital Competence and Pedagogical Management of M. Ed qualified Teachers.
34. There is significant correlation between Digital Competence and Pedagogical Management of Arts subject Teachers.
35. There is significant between correlation Digital Competence and Pedagogical Management of Science subject Teachers.
36. There is no significant difference between Male and Female teachers in Digital Competence
37. There is no significant difference between Male and Female teachers in Pedagogical Management
38. There is no significant difference between B. Ed and M. Ed qualified teachers in Digital Competence
39. There is no significant difference between B. Ed and M. Ed qualified teachers in Pedagogical Management
40. There is significant difference between Arts and Science subject teachers in Digital Competence
41. There is no significant difference between Arts and Science subject teachers in Pedagogical Management
42. There is significant effect of Digital Competence on Pedagogical Management.

Conclusion:

From the study done to determine the Correlation between the variables, it is revealed that, there is a significant relationship between **Digital Competence** and **Pedagogical Management** of school teachers, with respect to **a) Gender (Male / Female)**, **b) Qualification (B. Ed / M. Ed)**, and **c) Subjects Taught (Arts / Science)**, and from the results of the **t - test,** it is concluded that there is no significant difference between in **Digital competence of Male/Female teachers**, **B. Ed / M. Ed qualified teachers**, but significant difference was there between **Arts and Science** subject handling teachers . There was also no significant difference in Pedagogical management between **Male/female teachers, B. Ed / M. Ed qualified teachers and Arts / science** subject handling teachers, we can also infer through regression analysis that there is a **significant impact** of **Digital competence on Pedagogical Management**, which is an indication that **Digital Competence is strongly associated with the variations in Pedagogical Management skills.**

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