A Study on Usage of Digital Pedagogy for Sustainable Learning
(With special reference to Graduate students)

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Abstract- Teaching in the digital age is a new challenge for the teaching fraternity. The process of digitization is actually taking a turn in almost all the sectors including the educational sector. Keeping that in view, this research paper makes an attempt to identify the impact on digital pedagogy upon sustainable learning. The other objective was to find out the problems faced by the teachers in implementing the digital pedagogy as a tool of teaching and learning.

In order to collect the Primary data, simple random sampling technique was utilized. A structured questionnaire was designed and was circulated among the graduate teachers. On the whole, 182 respondents have responded to the questionnaire. To test the impact of digital pedagogy upon sustainable learning a Non – Parametric Test known as Chi – Square was used. To analyze the data, simple percentages, frequencies and charts were utilized.

It was concluded that there is an impact of digital pedagogy on sustainable learning.

Keywords: Digital Pedagogy, Learning, Teaching, Sustainable.

I. INTRODUCTION:
Teaching is always a planning of adding new concept or design in the pedagogy. This is a continuous update of knowledge for any teacher. Entire world is moving to digitization today. There is a lot of need for digital pedagogy. Advancement of technology and effects of pandemic highlighted the need for the collaborative digital pedagogy, ICT for sustainable learning. Methods of teaching are being dynamic, enriched to increase employability and suit the present job market conditions.

Pedagogy includes teaching which is planned course content, includes several methods and modes. Pedagogy is of different types as follows
a. Teacher centric
b. Learner centric
c. Learning centric
d. Interactive and participative pedagogy

Digital pedagogy includes the use of contemporary methods, technology in teaching and learning. It focuses distance learning, MOOCs.

Sustainable learning will be possible with effective teaching. Classroom learning makes lot of change in the abilities and knowledge of students due to shared content, knowledge, conversation that takes place in the class environment. New modes of teaching and learning, interactive teaching methods are attracting the student world. To curate the students with new way of introducing the subject knowledge and to grab their continuous attention is a topic on demand in any level of learning. This demands the facilitators to always update themselves on their subject as well as digital platforms for teaching the young minds.

1.1 Objectives of the study:
1. To study about the awareness levels of digital pedagogy among the graduate teaching fraternity.
2. To analyze the impact of digital pedagogy upon sustainable learning in graduate students.
3. To examine the problems faced by the facilitators when implementing digital pedagogy.

1.2 Hypothesis of the study:
H0: (Null Hypothesis) - There is an impact of digital pedagogy upon sustainable learning.
H1: (Alternative Hypothesis) - There is no impact of digital pedagogy upon sustainable learning.

1.3 Research Methodology:
The present study has considered exploratory and descriptive research designs to explore the factors and the impact of digital pedagogy upon sustainable learning. The current research has opted for collection of data through questionnaire. A relevant questionnaire was designed and the same was administered to 182 faculties working in under graduate colleges. The sampling technique utilized was convenience sampling. The study has also considered an amount of secondary data through published online sources.

1.4 Need and scope of the study:
The entire world is travelling towards digitization. So in par with the concept of digitization, the education industry also is looking for sources to successfully implement the concept of digital teaching and learning. Especially because of pandemic in the recent times of India, we could see a sea change in the adoption of technology and digital in the field of education. Nevertheless, it is very much evident that we are still in progression stage of implementing it to a larger extent. Though certain educational institutions have developed their own ways of dealing with digital pedagogy, still in certain geographical areas, the concept of digital pedagogy and its impact on sustainable learning remains novice.
So, therefore there is a serious need for us to understand and analyze about digital teaching and learning process and its importance and impact on sustainable learning. The scope of the study is restricted to Hyderabad city and the research takes into consideration only selected colleges of graduation program from Hyderabad city. In the selected graduate colleges, specifically Bachelors of Commerce and Bachelors of Management programs were taken into consideration.

II. REVIEW OF LITERATURE

➢ Aaron R. Gierhart, (2023), opined that virtual teaching and learning strategies used since Spring 2020 will remain to varying degrees depending on the needs of students and families as well as practitioners and institutions. Digitally-mediated approaches that have “resonance” (Stornaiulo et al., 2017, p. 80) should emphasize the hybridized, flexible affordances of modern technologies (OECD, 2020b) and remove barriers to equitable participation for all learners (Lee & Brett, 2015). The pandemic revealed that these hybridized approaches can upend the ways teachers design and manage the classroom learning environment, especially when that space extends in abstract ways across time (synchronously and asynchronously) and space (e.g., virtual learning environments)

➢ Jerwin E. Cabanero, Cherill S. Granil, Rosecel V. Caro., (2022), concluded that Digital pedagogy orientation is the perceived orientation of the teachers on the relative position of information and communication technology in the teaching learning process. The digital pedagogy practice is the capacity of teachers to implement teaching-learning standards by assessing the extent of alignment of their professional teaching practice. Digital pedagogy competence measures teachers’ information, communication, and technology skills in the teaching-learning process. Teachers’ orientation, practice, and competencies provide an overview of how digital pedagogy is present and relevant in the learning process.

➢ Nanjundaswamy, C., (2021). Digital pedagogy makes the learners acquire skills beyond content. Digital pedagogy will inspire students to have sustainable learning, and it is mandated to grow now a days. The sustainable environment also should provide instructional tools and infrastructure in order to reduce issues in implementation of digital pedagogy. Innovative pedagogy and virtual learning increasing in teaching and learning process. as long as teacher adaptability on digital pedagogy is good, it can serve learners and create bonding without technology. Hence, “Technology cannot serve as a substitute for the Teacher,” and it retains both the educator and learner relationship as a whole.

➢ V I Toktarova., (2020). There is a need for restructuring the educational process and digital pedagogy with maximum efficiency. It prepares the students to implement professional activities in their life and digital economy. The transformation of the education system shows a clear need for restructuring the educational process in order to use the potential of digital pedagogy with maximum efficiency. It is designed to prepare modern students for the implementation of professional activities in the digital economy and for life in a digital society.

III. Data Analysis and Interpretation:

<table>
<thead>
<tr>
<th>Analysis of the age of the respondents</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 – 30</td>
<td>61</td>
<td>34</td>
</tr>
<tr>
<td>30 – 40</td>
<td>101</td>
<td>55</td>
</tr>
<tr>
<td>40 and Above</td>
<td>20</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>182</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Primary Data

Chart 3.1 – Age of the Respondents

Majority of the respondents (56%) belongs to the age group of 30 – 40 years.

3.1 To study about the awareness levels of digital pedagogy among the graduate teaching fraternity.

<table>
<thead>
<tr>
<th>Do you implement innovative teaching pedagogy in your teaching process?</th>
<th>Yes</th>
<th>No</th>
<th>Maybe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>78%</td>
<td>22%</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In the current times, do you think usage of digital pedagogy in the class room important?</th>
<th>Yes</th>
<th>No</th>
<th>Maybe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>67%</td>
<td>0%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Source: Primary Data
From the above statistics, 78% of the respondents are implementing innovative teaching pedagogy in their teaching process which further gives the clarification that they are aware of digital pedagogy as well. 67% of the respondents opine that usage of digital pedagogy is important in classroom teaching & learning process.

3.2 To analyze the impact of digital pedagogy upon sustainable learning in graduate students.

<table>
<thead>
<tr>
<th>There is an impact of digital pedagogy upon sustainable learning.</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>142</td>
<td>78</td>
</tr>
<tr>
<td>No</td>
<td>40</td>
<td>22</td>
</tr>
<tr>
<td>Maybe</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>182</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Primary Data
Statistical Test: CHI – SQUARE TEST (Goodness of Fit)
Step 1: Defining Hypothesis.
H₀: (Null Hypothesis) - There is an impact of digital pedagogy upon sustainable learning.
H₁: (Alternative Hypothesis) - There is no impact of digital pedagogy upon sustainable learning.
Step 2: Consider Level of Significance (α): 5%
Step 3: Calculated value

\[
\chi^2 = \frac{(O-E)^2}{E}
\]

<table>
<thead>
<tr>
<th>O</th>
<th>E</th>
<th>(O-E)</th>
<th>(O-E)^2</th>
<th>(O-E)^2/E</th>
</tr>
</thead>
<tbody>
<tr>
<td>142</td>
<td>60.6667</td>
<td>81.3333</td>
<td>6615.111</td>
<td>109.0403</td>
</tr>
<tr>
<td>40</td>
<td>60.6667</td>
<td>-20.6667</td>
<td>427.1112</td>
<td>7.040295</td>
</tr>
<tr>
<td>0</td>
<td>60.6667</td>
<td>-60.6667</td>
<td>3680.445</td>
<td>60.6667</td>
</tr>
<tr>
<td>182</td>
<td></td>
<td></td>
<td>176.7472</td>
<td></td>
</tr>
</tbody>
</table>

Therefore, calculated \( \chi^2 = 176.7472 \)

Step 4: Calculation of degrees of freedom
\[ df = (n-1) = 3-1 = 2 \]
Step 5: Defining table value at LoS - 5%, df = 2
Table value = 5.991
Step 6: Compare Table value and Calculated value
When compared, calculated value is greater than table value.
So, therefore accept the null hypothesis and reject the alternative hypothesis.
Inference: There is an impact of digital pedagogy upon sustainable learning.

3.3 To examine the problems faced by the facilitators when implementing digital pedagogy.

<table>
<thead>
<tr>
<th>Do you have enough of resources in your institution to implement digital pedagogy?</th>
<th>Yes</th>
<th>No</th>
<th>Maybe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>44%</td>
<td>56%</td>
<td>0%</td>
</tr>
<tr>
<td>Is syllabus completion a constraint for implementing digital pedagogy in your teaching and learning process?</td>
<td>44%</td>
<td>56%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you think implementing the digital pedagogy for sustainable learning will burden the work of the facilitator?</td>
<td>11%</td>
<td>44%</td>
<td>44%</td>
</tr>
<tr>
<td>Is it tough to manage students in the classroom environment while using digital tools?</td>
<td>22%</td>
<td>78%</td>
<td>0%</td>
</tr>
<tr>
<td>Do you think age of the facilitator in one factor which affects the usage of digital pedagogy?</td>
<td>33%</td>
<td>22%</td>
<td>44%</td>
</tr>
</tbody>
</table>

Source: Primary Data
From the above data, the respondents have shared their opinion regarding the problems faced by them in implementing the digital pedagogy in their teaching and learning process. They shared that though implementing digital pedagogy will benefit the institution in terms of Accreditation Process (NAAC, NBA, AICTE…), the institutions are not having enough resources to provide for implementation of digital pedagogy in their process.
IV. Conclusion
Impact of Digital Pedagogy upon sustainable learning is evident with the above analysis. It can be concluded that though digital pedagogy is one among the innovative techniques, it has that aroma of creating greater amount of learning in the students at a very quick pace as we are living in the digital era. The classroom environment also takes up a change when a teaching fraternity utilizes digital tools to make the students understand the topic. It leads to sustainable learning because these tools and techniques involves active role of students along with their creativity and out of the box thinking skills.
As a new adoption, this has its own challenges and pro’s and con’s. Challenges like age of the facilitator, not having enough of resources, financial constraints, to update our self about the happenings, are evident. However, greater the challenges, greater the results in terms of life long and sustainable learning.

REFERENCES: