

# Attuning digital pedagogy into English Language to empower graduating Engineers

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**Demand for English language proficiency among the engineering graduates with adept digital communication skills is growing in the contemporary global context. Industry 4.0 places English in the center of digital communication. It demands young engineering graduates with digital communication skills in English. This not only places importance of graduates learning English communication skills but also on the teachers to initiate novel pedagogical approaches. It is imperative to initiate these transitions during the students' graduation stage to ensure their readiness for the industry. The digital teaching and learning in English underscores the need for a fresh pedagogical approach that aligns with the preferences of millennials, facilitating learning across virtual and traditional platforms. Smart classrooms bridge the divides between the teacher and the taught. The evolving landscape of English education calls for a pedagogy infused with technology. Post-COVID, digital pedagogy is supplanting conventional one-on-one teaching methods, integrating techniques like blended learning through Learning Management Systems (LMS), flipped classrooms, self-directed learning, and collaborative approaches. This paper argues for the integration of digital pedagogy in regular classroom teaching and learning in English. The paper suggests that the use of digital media should not stop with the resumption of offline teaching, after COVID, rather should be an integral part of pedagogy in teaching English to engineering graduates. It is believed that digital pedagogy augments learner engagement, fostering active learning. The study underscores the significance and scope of digital pedagogy in the computer-centric era. The present paper represents the findings of the empirical research which sought to compare and contrast the conventional learning mode with blended learning.**

**Keywords: Digital pedagogy; ELT; Engineering graduates; Industry 4.0**

Effective communication skills stand as pillars for nurturing and sustaining meaningful human relationships. Communication is an intricate process encompassing proficiencies in listening, speaking, reading, and writing. Communication is complete when a message is not only transmitted but also comprehended with precision. In this intricate tapestry of linguistic exchange, English occupies a pivotal role. It has been the fulcrum of knowledge exchange across globe, thanks to colonization and later to globalization. It has attained the recognition of universal language thus

demanding the non-English speaking countries to incorporate teaching and learning English as an integral part of curriculum. It etched an indelible mark in the globalization process and in knowledge explosion. Beyond its linguistic value, English has evolved into a quintessential employability skill in the globalized world. The universal recognition of English as a lingua franca rendered it indispensable for both teaching and learning, and employability.

Globalization aided by 'Industry 4.0' is placing demands on all domains of education, including engineering education.

The evolving 'techno-pedagogy' using ICT (Information and Communications Technology) tools in the English Language Classroom cater to the needs of millennials. Which include FM Radio(Frequency Modulation), ETV(Educational Television), eBooks(Electronic Books) Audio Books, Educational Video, Multimedia, IPTV(Internet Protocol Television), Interactive Whiteboards, Digital Storytelling, www, Smart Phones, Tablets, iPads, Virtual Labs, Simulations, Games, Wikis, Blogs, Podcasts, Applets, Facebook, Skype, Twitter, WhatsApp, LMS / CMS(Learning Management System/Content Management System), MOOCs(Massive Open Online Course), OER(Open Educational Resources), Educational Cloud, Web 2.0, Mobile Apps, AI / VR / AR Tools(Artificial Intelligence/Virtual Reality/ Augmented reality). "In this digital era of Industry 4.0, the use of smart classroom environments is becoming more common and supports Gen-Z learning engagement. Recent research has reported that digital native GenZ learners adopt a skim reading of the web, and a decline in students' cognitive capacity has been observed, impeding their higher order learning and critical analysis skill development" [Cervi, L., 2021]. It is also important for higher educators to learn, develop and apply digital technologies that are student-centered to enhance communication and improve their higher order thinking skills [Cickovska, E. 2020, Manzoni, B. 2021].

"According to Bloom's taxonomy of learning, the lower levels of cognitive skills provide a base for the higher levels of skills required for industry" [Bloom, B., 1956]. "Higher order skills include analyzing, evaluating and creating or synthesizing and require mastery of previous levels, such as understanding and applying knowledge to familiar or new situations"

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[Armstrong, P., 2019] Benjamin Blooms taxonomy (1956) was revised from nouns to verbs in 2001 [Liao, Y., 2017], which paved way to another modification known as Bloom's digital taxonomy.

"Higher education institutions have reported that students pursuing professional courses exhibit a gap in their active classroom engagement in their studies [Mikalef, P., 2019]. This has been attributed to the lack of application of HOTS that is necessary for an in-depth understanding of multi-domain concepts and application of theory to complex business problems faced with the industry 4.0 wave".

"The high level of automation and digitalization challenges for enterprises to not only manage their transition towards higher value technologies, applications and processes but also to upskill their human resources" [Galán, G.J, 2021; García-Alcaraz, 2019; Tatnall, 2020]. Teachers are the essential instruments responsible for pioneering change and play a crucial role in the ever-evolving digital background. In the dynamic digital environment, teachers serve as instrumental catalysts for change, wielding significant influence as they steer and shape the educational terrain of the digital age.

"Bloom's Digital Taxonomy helps us to navigate through the myriad digital tools and make choices based on the kinds of learning experiences we want students to engage in (Lightle, K., 2011). The use of this adapted version and the examples of tools it provides focus "should not be on the tools themselves, but rather on how the tools can act as vehicles for transforming student thinking at different levels. "Bloom's digital taxonomy aligns with the current requirements of educators. The vast majority of teachers in the United States believe that integrating technology improves student learning" (NEA-AFT 2008; Project Tomorrow 2010), (Bloom, B.S, 1956)

"Teachers who are integrating technology report that students are more motivated to learn, apply their knowledge to practical problems, and take ownership of their learning. Teachers also report that by using technology, students are developing key 21st-century skills including creativity, collaboration, and skills in problem solving and critical thinking [Anderson and Krathwohl, 2000]. This study includes both teachers and students. Initially, we conducted a survey to gather insights from teachers regarding digitization in education. Subsequently, a separate survey was conducted among students to understand their perspectives on digitization." The surveys were conducted through Google forms.

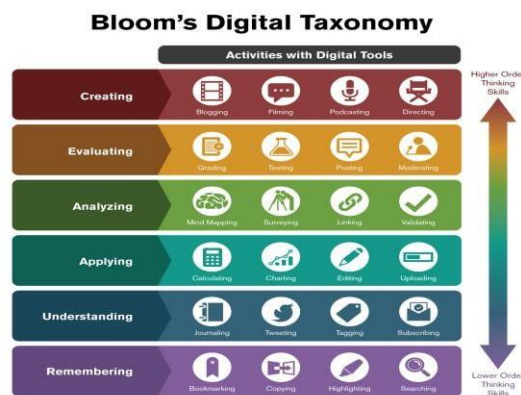


Fig. No.1. Source:

(<https://teachonline.asu.edu/2016/05/integrating-technology-blooms-taxonomy/>)

## II. LITERATURE REVIEW

"This research investigates the transition from the didactic method of teaching to learner-centered digital pedagogy. It specifically focuses on the linguistic competence of technical graduates in the context of Industry 4.0 and how Education 4.0 can align with current demands to prepare these graduates for the industry. Due to the development of digitalization and robotics, we are facing the next industrial revolution, known as the industry 4.0. The emerging technologies have huge effect on the education of people. Only qualified and highly educated employees will be able to control these technologies. The industry should collaborate with universities" [Baygin M., 2016].

"Teaching is a centuries-old practice; accordingly, teaching methods and forms have been discussed for ages. Teaching styles have changed as a result of technical advances [Ayneet Kaur]. Moreover, several researches on the effect of different technology on learning outcomes have been published. Glover et al. [Raed S. Alsawaier]. explored the effects of digital presentations on pedagogy in the classroom. [Glover, 2005]. This study also delves into the evolution from pedagogy to andragogy and, ultimately, to heutagogy. The term 'Heutagogy', originating from the Greek word "self", was defined by Hase and Kenyon in 2000 as the study of self-determined learning. According to Graham R. Parslow, it is defined as a method of teaching by allowing students to discover for themselves."

"As Lisa Marie Blaschke wrote in 'The International Review of Research in Open and Distance Learning,' heutagogy can produce "learners who are well- prepared for the complexities of today's workplace."

"In most college classrooms, the professor lectures and the students listen and take notes. The professor is the central figure, the "sage on the stage," the one who has the knowledge and transmits that knowledge to the students" [Alison King, 1993]. "The transition should be from sage on stage to the guide by side. Teacher should be a game changer and play a critical role in this transformation phase, thence the discovery of various methods of andragogy used in the present context".

“Flipped Classroom has evolved into an undeniable popular pedagogy, driven by the momentum of many teachers across the world who have embraced the idea” [Nagwa A. Solimana, 2016]

“In jigsaw, as with all cooperative learning approaches, the professor says very little but unobtrusively arranges the context and facilitates the process” [Alison King, 1993]

“Kahoot! is a game-based learning platform used to review students’ knowledge, for formative assessment or as a break from traditional classroom activities. It is among the most popular game-based learning platforms, with 70 million monthly active unique users and used by 50% of US K12 students” [Rabail Tahir, 2020].

“The application of gamification in a pedagogical context provides some remedy for many students who find themselves alienated by traditional methods of instruction. The use of gamification could provide a partial solution to the decline in learners’ motivation and engagement the schooling system is facing today” [Raed S. Alsawaier, 2018]

“Fostering students’ creativity is one indicator for good teaching and learning in higher engineering education. Recently, several approaches for fostering creativity in higher engineering education have been developed”. [Tobias Haertel, 2015]

“Through analysis of quantitative data reports and surveys along with qualitative teacher reflections, the preliminary findings show high levels of engagement and a positive attitude towards technology-driven teaching amongst students, and noticeable improvements in student performance and design outcome” [Amarpreet Gill, 2023]

“Various online learning platforms have become prominent in recent times. These technological tools can facilitate students’ language learning process”. [Maisha Sadaf, 2023]

“The author details the process of moving from a teacher-focused closed system of learning to a student-centred digital pedagogy that engages the student in uniquely rigorous ways utilizing varied technologies” [Shawn L. Robertson, 2019]

“The new century introduced significant changes in didactics and teaching methods. The most observable phenomenon is now the Internetization of society and the penetration of digital technologies into learning. The modern generation of schoolchildren is known by the name digital, socially digital” [Lightle, K. 2011], and generation Z [Hietajärvi L, 2015]

### III. OBJECTIVES

The paper examines the evolution of English instruction in technical education, emphasizing its interactive and participatory nature due to the integration of digital pedagogy. The study critically assesses how digital pedagogy is used to teach English to engineering students and explores how educators perceive and use these tools. The goal is to understand the level of integration and effectiveness of digital pedagogy compared to traditional methods in enhancing language learning. The study also investigates students’ preferences between these approaches.

### IV. METHODOLOGY

The study is based on the two surveys conducted with the English teachers and students of engineering colleges. The surveys focus on two distinct areas: one focusing on digital pedagogy which was administered to the English teachers, while the other aims to discern students’ preferences regarding their favoured learning mode, whether traditional, digital, or a blend of both. The respondents of the survey are English teachers teaching in engineering colleges and engineering graduates.

The surveys employed are close-ended questionnaires, designed as separate Google Forms, which underwent preliminary testing with select English teachers and students prior to their administrations to the targeted respondents. Both the surveys were shared online using email and WhatsApp with the respondents. In all 178 teacher respondents and 162 student respondents were approached for data collection. Despite the best efforts of the researcher and consistent reminders and outreach, only 102 teachers and 83 students responded to the survey. They filled the questionnaire online. The data was collated by the researcher and analyzed.

### V. FINDINGS AND DISCUSSION

The survey for teacher respondents attempted to analyze the perceptions of teachers on the integration of digital pedagogy into English Language Teaching (ELT). A significant proportion of teacher respondents (about 61 percent) reported utilizing Learning Management Systems (LMS) such as Moodle (Modular Object-Oriented Dynamic Learning Environment) or Edmodo, while about 18 percent employing traditional methods of teaching like chalk and talk method. About 19 percent of the teacher respondents reported to be integrating digital pedagogy along with traditional method of teaching.

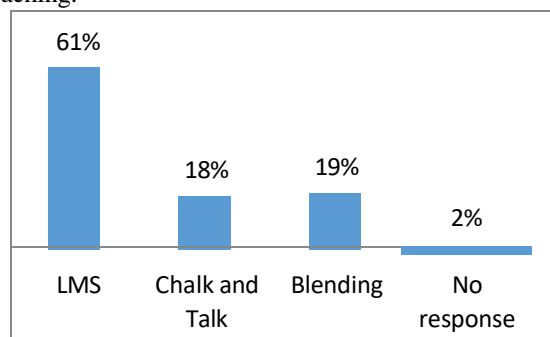


Fig. No. 2: Teachers’ preferences of pedagogy

LMS= Learning Management System which is part of digital pedagogy

Regarding their ease with using digital pedagogy in classroom teaching, an overwhelming, about 95 percent of teacher respondents suggested that they are very comfortable or

comfortable, whereas a mere 4.5% reported having manageable comfort levels.

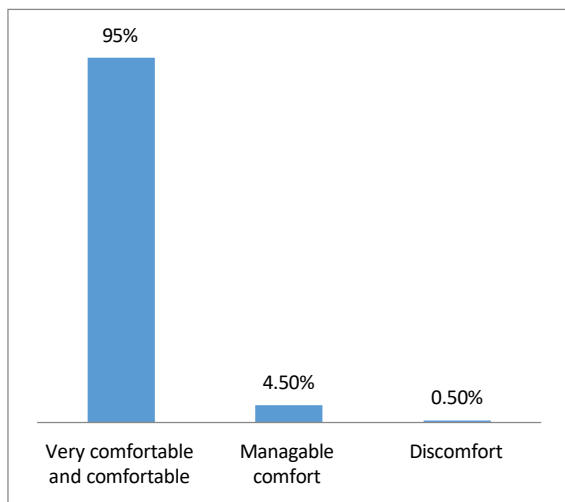


Fig. No. 3: Ease of digital pedagogy

When asked about the impact of digital tools on improving English language instruction, 58 percent reported a significant

enhancement in their teaching practice, while 32 percent acknowledged a moderate level of improvement. Only a mere 3 percent reported no discernible improvement resulting from the integration of digital pedagogy in ELT.

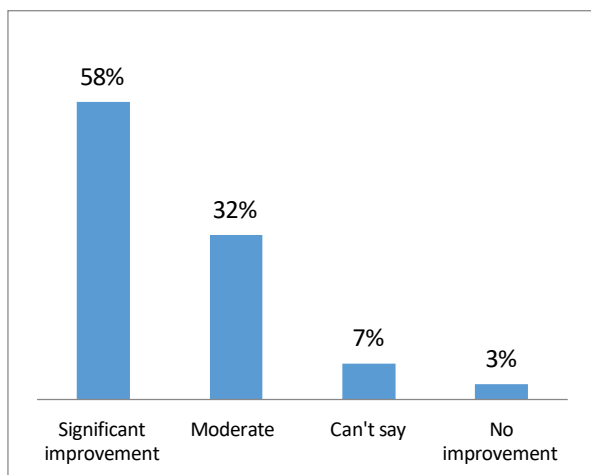


Fig. No. 4: Impact of digital pedagogy in ELT

On the question of frequency of usage of digital pedagogy

about 34 percent of teacher respondents reported to be incorporating digital tools into their teaching twice a week, closely followed by about 32 percent who employed them once a week only. A smaller proportion of 18 percent of teacher respondents reported to be integrating ICT tools on daily basis, while 16 percent reported their usage occurring once a month.

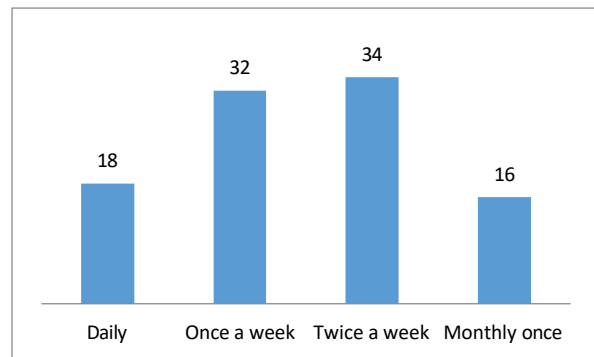


Fig. No.: 5: Frequency of use of digital pedagogy

When asked about the benefits of using digital pedagogy in English Language Teaching, about 32 percent of the teacher respondents said that it provided flexibility in teaching, while 25 percent said it was an effective means of communication. About 23 percent of respondents expressed that it provided better access to resources, while 20 percent felt that it increased the engagement of learners in the classroom.

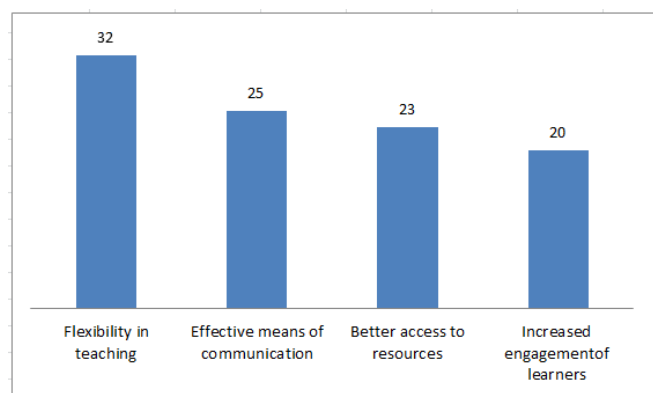


Fig. No.6: Benefits of using digital pedagogy

Regarding the assistance anticipated by educators concerning the integration of digital pedagogy for English Language Teaching, about 32 percent expressed a desire for both technical and pedagogical support. Meanwhile, 21 percent sought access to pertinent resources and materials, and 16 percent expressed a need for training and opportunities for professional development.



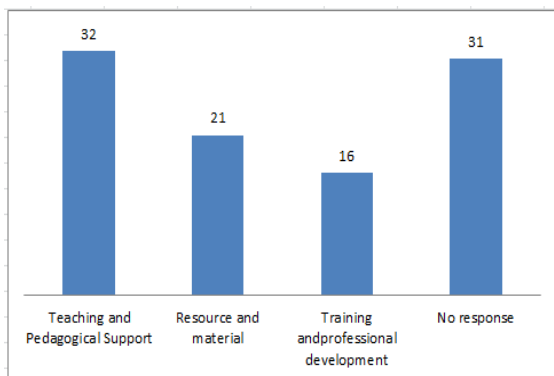


Fig. No.7: Support required for digital pedagogy

Concluding the survey, participants were queried about the anticipated role of digital pedagogy in the future of English Language Teaching. Of those surveyed, about 52 percent envisioned digital pedagogy becoming an inseparable component of ELT, whereas 46 percent held the view that it will provide supplementary support to ELT. A mere less than 2 percent of respondents expressed the belief that digital pedagogy would have no bearing on ELT.

In summary, the findings of the survey indicate that digital pedagogy is poised to assume a significant role in shaping the future landscape of English language teaching.

Another survey was conducted with student respondents. The respondents were asked to fill the survey shared using Google form online. The Google form was created containing questions on digital pedagogy, blended teaching approach, on gamification, flipped classroom approach, and Moodle (Modular Object-Oriented Dynamic Learning Environment) in English language teaching. The respondents were collated and analysed. The findings of the study are discussed below.

### Teaching Method Preferences:

Gamification involves active learning on the part of the students. In this learning process students are asked to draw or build a story along certain prepositions which are otherwise difficult to convey the meaning effectively. A question was asked to the student respondents on their preferences of using gamification as a method of teaching. A large majority of the students (84 percent) preferred digital learning mode using Moodle and gamification. Only 14 percent of the students preferred the conventional or traditional teaching method. Traditional method of teaching involves "chalk and talk" method wherein the teacher uses chalk board extensively. It may be inferred that the students from vernacular medium background prefer chalk and talk method while those studied in English prefer digital teaching.

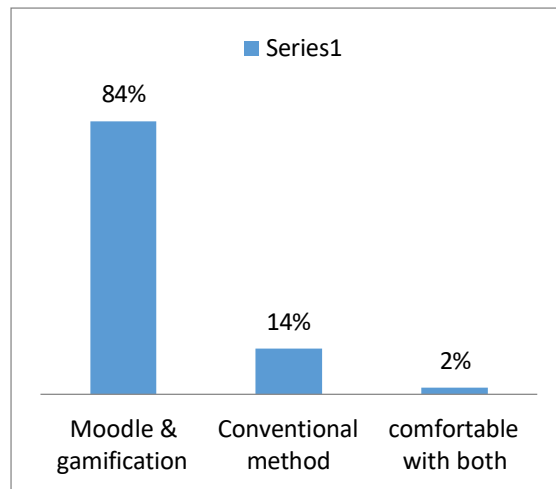


Fig. No. 8: Preferred mode of learning

Flipped classroom is gaining wider acceptance in language teaching. Particularly in English teaching flipped classroom provides the opportunity for students to learn the subject beyond space and time boundaries. In a flipped classroom approach the topic is shared on the digital platform with the students and this enables students to learn the topic whenever they feel like and wherever they feel comfortable. For example, students can access the topic shared on the digital medium sitting at home during evenings or nights times. This method overcomes the traditional teaching modes which limit the teaching learning process to classrooms during the college hours. It, therefore, extends the interaction of the students with the topic concerned beyond the formal interaction in a classroom setting. Data suggests that the students found flipped classroom method effective and engaging. About 88 percent of the respondents preferred flipped classroom as a method of learning English.

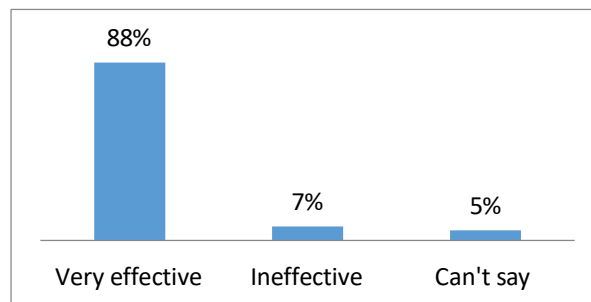


Fig. No. 9: Perceptions on flipped classroom approach

Moodle has emerged as an effective digital platform for teaching in the post-COVID times across the globe. In this method the topics for discussion are placed by the teacher in the Moodle platform which can be accessed by the students at their convenience. Moodle platform allows students to join online groups and discuss. It allows for virtual participation of students and expresses their views without inhibitions which are otherwise associated with the physical classroom interaction. The virtual group discussions enable the introverts to speak

freely and express their views boldly. The advantage with the Moodle platform is that the group discussions are created and monitored by the teacher who encourages all to participate. About 91 percent of the respondents observed that they submitted assignments and participated actively in the moodle discussion forums. The moodle platform allows for recording and reviewing their performance which helps the poor learners to identify their strengths and weaknesses.

Digital pedagogy is an integral part of teaching in the present context. Digital medium has become accessible to all, particularly to the young engineering graduates. Smart phones, tabs, laptops have become the extensions of blackboard. For a teacher to make effective teaching, these digital gadgets have emerged as important means of pedagogy. The teacher of today is creating digital content, irrespective of subject, and sharing on the digital platform with the students. Typically, in English language teaching, the teacher can create digital content and make it available online. The content can be accessed using internet anytime. A question was asked to the respondents about their perception on the usage of digital pedagogy in English teaching. An overwhelming percentage of respondents (about 99 percent) found the digital pedagogy was useful in learning English.

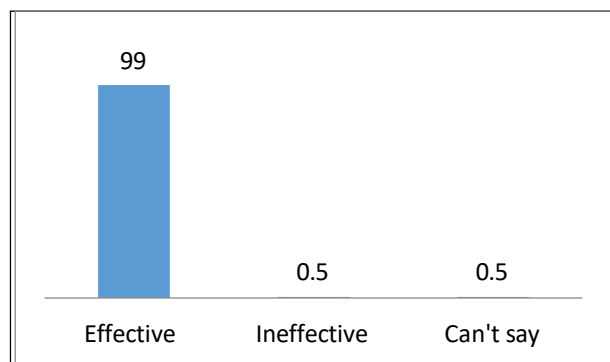


Fig. No. 10 Preference for Digital learning

A vast majority of the respondents (about 95 percent) found the instructor's use of Moodle and WhatsApp for clarifying doubts to be effective and beneficial. The instructions were reported to be instantaneous and thus helpful. Digital medium offers opportunities not only in teaching but also in assessment and feedback. The assessment using digital platform is instant and thus helpful for the students to know their strengths and weaknesses immediately. Moreover, the assessment is personal which is beneficial to those weak students who do not like to know their assessment in the classroom.

The teachers who use digital pedagogy extensively are appreciated by the students of this generation. Particularly, the engineering graduates welcome the efforts of the language teachers in producing digital teaching material and look forward to learn from them more and more. The respondents were asked to express their opinion on their willingness to support the teacher who uses digital pedagogy and for which an overwhelming percentage of respondents reported to be happy with the teacher who practices digital pedagogy more than those

who don't.

Overall, the study finds that the teachers adopting digital pedagogy were appreciated by the large number of respondents. The Gen Z students are those who use digital gadgets extensively and it is observed in the study that, this generation of students prefer digital content more than the traditional mode. However, it may be pointed that the preference for digital pedagogy is influenced by the non-native speakers' factor.

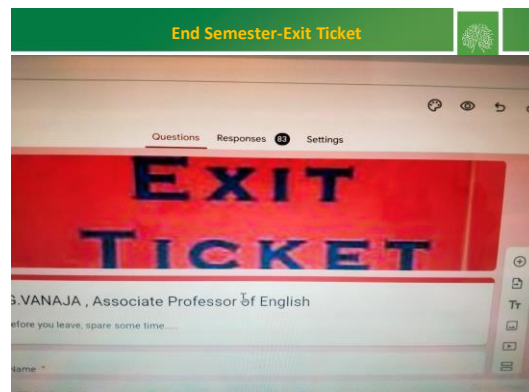
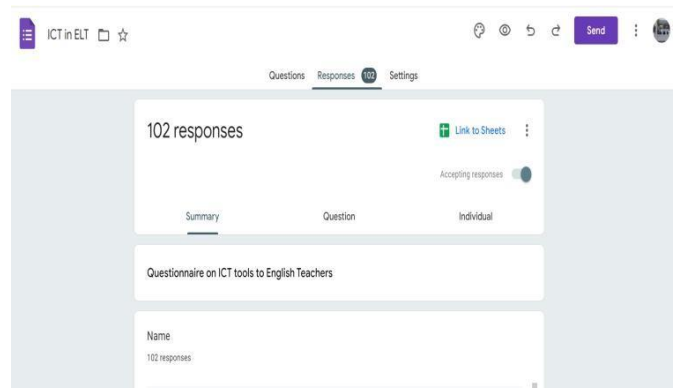


Fig.No.11: Google form



## VI. CONCLUSION

In conclusion, this research paper has provided valuable insights into the perceptions of teachers regarding the integration of digital pedagogy into English Language Teaching (ELT). The survey on teacher respondents suggest that majority of the respondents use digital pedagogy in teaching and it may be said that the digital pedagogy has made its way into English language teaching in engineering colleges. A large majority of the respondents are also comfortable in embracing technology in the classroom. The digital pedagogy also reported to be impacting positively on students' learning English language. Majority of the teachers use digital pedagogy more frequently than before as it provided flexibility of teaching, making communication effective and increased learners' engagement with the content of learning. The survey finds that the support

and assistance to teachers in making ELT completely in digital mode requires resources, training and professional development opportunities. A majority of the respondents foresee digital pedagogy becoming an inseparable component of ELT.

In all, it may be said that the findings indicate a positive attitude among teachers toward the integration of digital pedagogy into ELT to cater to the needs of industry 4.0. They highlight the potential of technology to enhance teaching practices, engage learners, and provide valuable flexibility. However, it is crucial to address the needs for support, resources, and training to ensure effective integration.

The survey on digital pedagogy, gamification, and flipped classrooms in English language teaching, finds that majority of the student respondents prefer digital learning than chalk and talk. A majority of the student respondents, especially those with a background in English medium education, showed a strong preference for digital learning methods, such as Moodle and gamification, over traditional chalk-and-talk teaching. This shift reflects the growing acceptance of technology in education, providing students with more flexibility and engagement opportunities. The flipped classroom approach it allows students to access learning materials at their convenience, majority of the respondents favouring it as it is reported to be enabling learning beyond the confines of physical classrooms and promotes self-paced learning. The study finds Moodle has emerged as an effective digital platform for teaching, enabling group discussions, virtual participation, and assignment submissions. Digital pedagogy was found to be highly useful, with nearly all respondents acknowledging its benefits in learning English. The use of instant communication tools like What'sApp for clarifying doubts was particularly appreciated by students, highlighting the importance of real-time support in the digital learning environment. The study also finds that the digital pedagogy has been beneficial to weaker students who may prefer private feedback. The student respondents were also appreciative of the teachers who adopted digital pedagogy and created digital content. The study noted a generational difference in preferences, with Gen Z students, who are accustomed to digital gadgets, showing a stronger inclination towards digital content. However, it's important to consider that preferences may be influenced by non-native speakers' backgrounds.

In summary, this research suggests that the integration of digital pedagogy, gamification, and flipped classrooms in English language teaching is not only well-received but also highly effective in engaging students, promoting self-directed learning, and providing valuable support. It underscores the evolving role of technology in modern education and the need for educators to adapt to meet the preferences and needs of today's students. Thus they can rise to the demands of industry 4.0.

The findings of the study need corroboration by similar studies. The impact of digital pedagogy has to be studied in different disciplines like traditional graduate courses and other fields also the impact of digital pedagogy has to be studied in rural setting and on students from poor and marginalised

sections of the society. There is also a need for institutional support for increasing application of digital pedagogy.

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