

# Blended learning -Assistive Technology Tools and Devices

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## ABSTRACT

**KEYWORDS:** Hybrid learning ,Tools and devices, Technological pedagogy , Academic Excellence , Digital learning, , active learning , instructional design .

NEP 2020 signifies the emphasis of integrating Technology in Education and hence the Educational system is undergoing a technological shift from traditional pedagogy to IOT based advanced pedagogy with the usage of innovative digital technological tools. These improve the overall learning ability of students to get adapted to deep learning and problem solving abilities. The teachers are transforming their role from knowledge provider to facilitators and stand as pedestrians on information superhighway guiding and trying to balance multiple approaches of pedagogies to create a dynamic learning environment. The technology integration in curriculum and learning methodologies evolve the cognitive abilities and collaborative learning levels of students . Moreover these devices and tools provide smart solutions to improve the academic learning of stakeholders and enhance their social skills so as to perform their functional capabilities, tasks in the rapidly changing digital world demanding high skill and Expertise . Blended learning needs professional development of teachers to adapt the resources and to utilize all these tools into regular teaching. The aim of this paper is to discuss briefly about the pros and cons of new classroom modes and models .

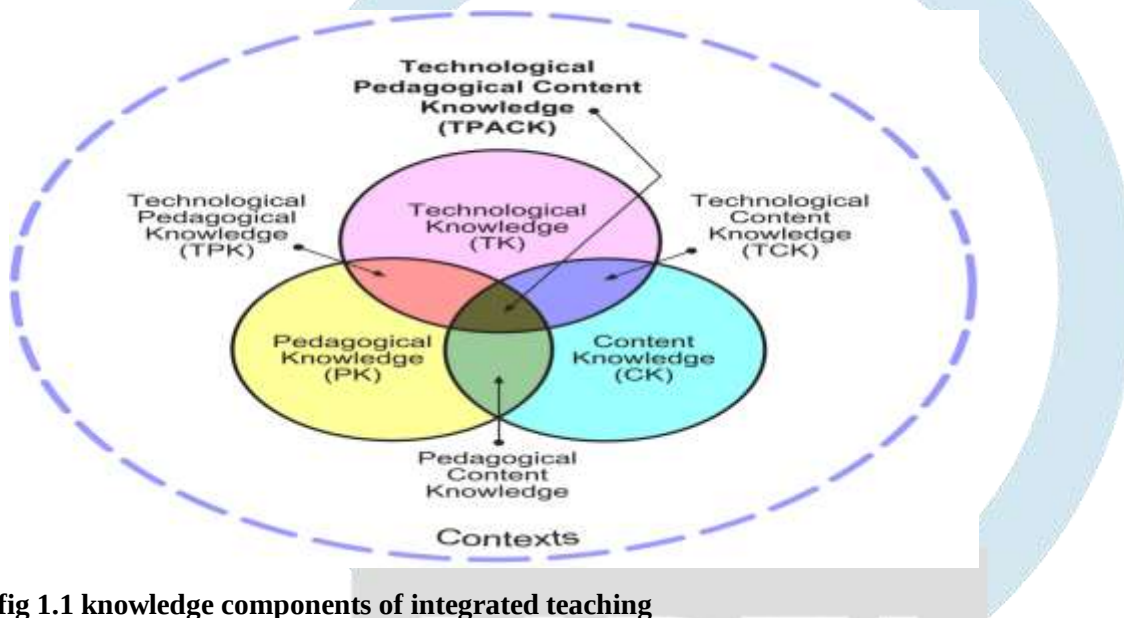
“Digital transformation in higher education is just a beginning” . Digital transformation refers to the strategic use of digital technologies and practices . The embarrassment of these new digital education tools and services enrich and enhance higher education and add core values to the higher education mission. Technological integration in teaching and learning is one of the key points focussed by NEP 2020 at all levels of education to make the students accessible to resources and tools that enhance their experience.

## 1.0 SCOPE

With emerging advances in technological field like big data, machine learning, and artificial intelligence, many unskilled jobs are taken over by machines, and need for a skilled workforce in mathematics, computer science, and data science, in conjunction with multidisciplinary abilities across the sciences, social sciences, and humanities, will be increasingly in greater demand in future..In this rapidly changing global education systems , it is becoming increasingly critical for teachers not only to teach but more importantly how to teach and frame a pedagogy to connect between chalk board systems and technology based education . Education thus, must move towards less content, and more towards learning about how to think critically , solve problems with creativity, innovation and adapting multidisciplinary approaches. Pedagogy must evolve to make education more experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centred, discussion-based, flexible, and, of course, enjoyable. Teaching is a complicated practice involving a combination of knowledge and technology based on teaching needs with complex knowledge steps of structured design for all elements of teaching . This paper presents a brief overview of technology based integrated teaching techniques .

## 1.1 TECHNOLOGY BASED TEACHING

Technological pedagogical knowledge is an understanding of how teaching and learning can change when technologies are used in particular ways. There is no “one best way” to integrate technology into the curriculum . Rather, integration efforts should be creatively designed or structured for particular subject matter ideas in specific classroom contexts . Heart of Technology based teaching is three knowledge bases ie content, pedagogy, and technology and the proper relationship between them. The three key components of a teacher's knowledge are understanding the content, understanding of teaching, and understanding of technology. The complexity of technology integration comes from an accumulation of the rich connections of knowledge among these three components .An overview of the instructional framework is provided by., Koehler & 2008 , in the context of pedagogical practices which includes integration of technological tools in teaching learning structural design.



**fig 1.1 knowledge components of integrated teaching**

Knowledge of content (CK) is of critical importance for teachers. This knowledge would include knowledge of concepts, theories, ideas, organizational frameworks, knowledge of evidence and proof, as well as established practices and approaches toward developing such knowledge. Pedagogical knowledge (PK) is teachers' deep knowledge about the processes and practices or methods of teaching and learning. They encompass, among other things, overall educational purposes, values, and aims. This generic form of knowledge applies to understanding how students learn, general classroom management skills, lesson planning, and student assessment. It includes knowledge about techniques or methods used in the classroom; the nature of the target audience; and strategies for evaluating student understanding.

Technological knowledge (TK) is the best use of available online resources and technological tools for effective teaching . PCK-Pedagogical content knowledge focuses on specific content delivery with active learning and student engagement . TCK-Technical content knowledge involves how technology can support, enhance and integrate tools for teaching .

TPK Technological pedagogical knowledge focuses on using technology to access, assess and collaborate to enhance learning . TPACK Technological pedagogical content knowledge allows the educators to make decisions to use apt technology to facilitate deeper dynamic Teaching and Learning .

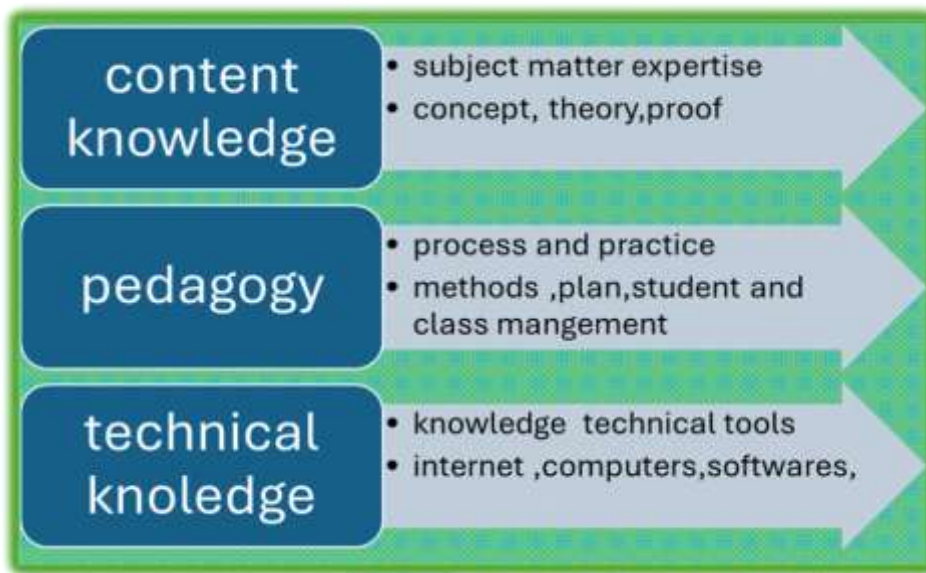


fig 1.2 Core elements of Integrated Teaching

### 1.3 CLASSROOM MODEL -INSTRUCTIONAL DESIGN

In the above context a model plan for the topic Mix design of concrete for the subject concrete technology is designed and structured and executed in the classroom for an effective teaching and learning strategy . The content knowledge , pedagogical and technical knowledge content of this topic is dealt in detail and updated from traditional pedagogy of using black boards and books into schematic breakdown of three basic components of TPACK pedagogy and shown in fig 1.3, for the above Mix Design concrete using IS code method. The steps involved are assuming data for target strength requirements of concrete mix for the specific application and use. The data assumed like specification of ingredients and the workability requirements with optimum water cement ratio. It's a complicated subject matter to be dealt with by the knowledge of students and basic practice followed in civil engineering.

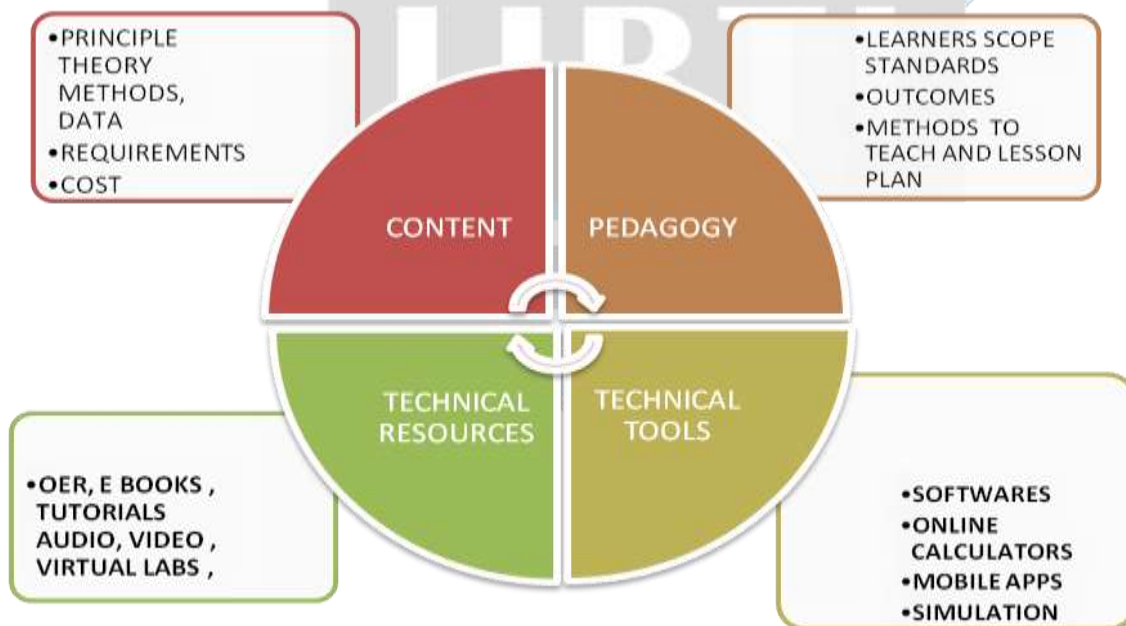


fig 1.3 Instructional model using TPACK framework

- support the effective teaching of mix design with its codes .Use of OER as participatory teaching methods improve the critical thinking and problem solving ability.

- TPK - Use of mix design software ACI Mix design softwares, , online excel sheet templates ,online calculators, mobil
- Content knowledge :This involves knowing the principle of design , methods , Data,Tests standards course outcome, program objectives of the subject matter at a deep knowledge level .
- Pedagogical knowledge : planning structured lesson plan and executing as per the knowledge level of learners , and the outcome level of learning using active learning modes of lab experiments , evaluate and check the results using observations and calculations .
- Technological knowledge : Awareness of technical tools , softwares , OER platforms, virtual labs, mobile applications , tools for collaborative learning to share and print the content delivery. Application of a wide range of relevant softwares, online calculators, excel sheet, quiz and simulation tools.
- PCK - Active learning and engagement is opted by hands-on experiment problems and discussing real time issues with virtual labs .
- TCK - Effective utilisation of SWAYAM, swayam prabha, npTEL, for teaching learning reference materials which encompass a wide range of lesson plans ,videos, tests, softwares, and textbooks e applications and simulations using AI , for enhancing the personalized and interactive learning process with improved skill sets.
- TPACK - The core intersectional element is the teachers decision to apply the above tools for cost effective solution of mix design.

## 1.4 RESULTS

**Table 1.4 mix design results by various applications comparative statement**

| Basic ingredients        | Manual method  | Online calculators | Mobile apps    |
|--------------------------|----------------|--------------------|----------------|
| <b>Cement</b>            | <b>320 kg</b>  | <b>308 kg</b>      | <b>380 kg</b>  |
| <b>Water</b>             | <b>150 kg</b>  | <b>170 kg</b>      | <b>199 kg</b>  |
| <b>Fine Aggregate</b>    | <b>744 kg</b>  | <b>650 kg</b>      | <b>717 kg</b>  |
| <b>Coarse aggregateA</b> | <b>1250 kg</b> | <b>1220 kg</b>     | <b>1176 kg</b> |

The results analysed with various tools simplify the critical complex manual calculations and results vary in usage of data, but it can help to understand the simulation in a simple way by changing the input data and tally to understand variations in results. Thus a complex topic is made simple by the use of technological applications .

## 2.0 CONCLUSION

Students of extreme diversity work together in classrooms and Instructors in Higher education need to include creative pedagogic strategies to reach diverse circle of learners. This Presentation aims to improve teaching and learning by creating a modern and engaging environment that supports flexibility and personalized learning. In ICT tools are especially useful for meeting the diverse needs of students and helping teachers make learning more inclusive and effective.

1. Understand the role of ICT in enhancing Technical education to suit course outcomes.
2. Examine the scope and application of ICT tools in teaching and learning processes.
3. Develop proficiency in integrating audio and video resources into pedagogy.
4. Explore Free and Open Source Software (FOSS) for effective instructional procedure .
5. Analyze the potential of immersive technologies in simplifying complex scientific concepts.

6. Leverage digital games and applications to foster engagement and improve learning outcomes.
7. Promote innovative pedagogical approaches to address diverse learning needs in education as it never ends but evolves continuously.
8. Use of sustainable concepts to facilitate knowledge of environmental impacts ..

## References

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## AUTHOR'S BIOGRAPHIES

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|  | <p><b>Charusheela S Deshpande. MTech<br/>(Water and land management) MISTE<br/>Selection Grade lecturer.<br/>Dept of Civil Engineering<br/>Maratha Mandal Polytechnic.<br/>Experience in teaching 30 years.<br/>Belagavi, Karnataka.</b></p> |
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