Scope of Introducing TPACK of Teacher Education Programme in India

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Abstract
The present study focused on the scope of introducing Technological Pedagogical Content Knowledge (TPACK) of a two-year pre-service and in-service teacher education program in India. This paper describes the TPACK awareness among teacher educators. It also emphasizes teachers educators integrate technology into education in the 21st century. The main objective of the study to find out the scope of implementation of TPACK on Teacher training programs & the relationship between technology and pedagogy content. Also, the researcher measures the curriculum and challenges to introducing TPACK and finally gives meaningful suggestions to gain technological skills. The methodology of the study is qualitative and interview methods are applied. The study is a mixed type involving interpretative, analytical study of documents, interview and study both primary & secondary sources, like books, university news, expert opinion, articles, journals, thesis and websites, etc.

Keywords: Curriculum, TPACK, Technology, Teacher educators, Pedagogy, Teacher training programme

Introduction
In this paper, we focus on twenty-first-century skills from the perspective of Technological Pedagogical Content Knowledge (TPACK), aiming to combine these frameworks. TPACK is a well-known theoretical approach among researchers studying (pre-service) teachers’ use of ICT (Voogt et al., 2013). TPACK can be seen as a flexible framework for various research purposes. In the Twenty-first-century, education and technology cannot be separate and technology integrated into instruction. ICT enhanced the curriculum and helped joyful learning (Das, K., 2019). Teachers and students perpetually move with varied technologies. In teacher education, one actively used, thanks to investigating teachers’ and pre-service teachers’ information associated with the utilization of ICT in education, is to find their Technological Pedagogical Content Knowledge (TPACK). The TPACK framework, introduced by Koehler and Mishra (2005), was developed to analyze teachers’ technology integration. Teachers’ technology use in education is viewed from the TPACK purpose of hold three foundational information areas: technology, pedagogy and content. The connections and interactions between the foundational areas, spoken as ‘intermediate information areas,’ are technological education information, education content information and technological content information.

Connecting all the information areas, i.e., TPACK will be seen because the information teachers and pre-service teachers’ would like for effective technology use in their profession. According to Voogt et al. (2013), lecturers should recognize varied education approaches to require the advantage of ICT and support students’ ordinal century skills.
There’s an agreement that lecturers should offer students learning content to support the students’ development of ordinal century skills (Rotherham & Willingham, 2009). TPACK is sweet basic teaching with technology; the pedagogical technique is a technology that uses in an exceedingly constructive thinks to teach the content, the knowledge of what makes that idea it’s to find out and the way technology will overcome some drawback moon-faced. Education and technology can’t be thought of individually and technology integration in education has become necessary (Dumpit & Fernandez, 2017; Liao, 2007). Ilgaz and Usluel (2011) list general teacher competencies in technology integration, victimization applicable digital tools in lessons, victimization technology in student comes, leading students to access the right info on the net, turning to transmission use in lessons, being hospitable innovations to find out and the way to use effective technology. Tantrarungroj and Suwanatthachote (2012) lend credence to the current that teacher education is meant to equip student-teachers with the education content knowledge, skills, and attitudes that are needed for room teaching.

A sound theoretical framework was missing till Shulman (1986, 1987) projected the pedagogic content knowledge (PCK) framework. Many students any conceptualized the PCK framework and projected a framework that enclosed technological knowledge (Angeli & Valanides, 2005; Keating & Evans, 2001; Koehler & Mishra, 2005; Pierson, 1999; Margerum-Leys & scoop, 2002; Niess, 2005, Pierson 1999). TPACK development at intervals an educator preparation program isn’t any doubt a posh endeavor wherever students may have to expertise a variety of learning opportunities to maximize their growth. It’ll so be vital for the school to rigorously monitor and assess student growth as they move across a program at varied points. TPACK may additionally be a moving target, as aspects of technology, pedagogy, and content knowledge still modification. Koehler et al. (2014) known 3 completely different ways for developing TPACK for lecturers and pre-service teachers: from PCK to TPACK, from TPK to TPACK and developing PCK and TPACK at the same time. Lecturers have an issue with group action technology in their tutorial processes. Education approaches required all the discipline in pre-service teacher training programs (Das, K., 2019). Thus even once the knowledge and technology (ICT) applications have tried to be effective in isolation, this doesn’t perpetually imply that constant effects also are accomplished in natural academic settings.

Teachers’ earnings and different factors area unit connected to their job satisfaction level (Roy & Das, 2020; Das, 2019). TPACK adds technological information as a replacement part that must mix in with domain and pedagogic information to effectively integrate ICT in educational practices. Empowering lecturers for effective technology integration doesn’t mean that they have to grasp the TPACK framework in and of itself. However, it implies that lecturers perceive a way to form educational practices during which technological, content and pedagogic information area unit is embedded.

### Digital Learning in Education

Digital learning is substituting ancient instructional strategies additional and additional day by day. The inclusion of digital learning within the school rooms will vary from merely victimization tablets rather than paper to victimization elaborate software package programs and instrumentality as hostile the straightforward pen. It empowers students by obtaining them to be additional fascinated by learning and increasing their horizons. The technology used at schools, colleges and universities have mature additional advanced, academics area unit employing new generation of software package product designed to induce their students to have interaction with course ideas in new ways in which.

Recently, many studies (e.g. McKenney & Voogt, 2009; Takacs, et al, 2015; Van First State Sande, et al) have shown that technology has the potential to foster these early acquisition strands, providing that the precise software package applications meet bound options which academics acumen to implant the technology in their room follow. Learning tools and technology modify students to develop effective self-reliant learning skills. Follow teaching is an associate degree integral part of teacher training program & there contains a scope to introduce ICT primarily based content (Das, K. & Chowdhury,
R., 2019). They’re able to establish what they have to find out, notice and use on-line resources, apply the knowledge on the matter at hand. Digital learning platforms deliver learning experiences that modify students to actively have interacted with instructional content. One in every of the foremost difficult aspects of teaching is that students area unit usually at totally different levels of mastery for a given talent. Technology-based teaching-learning has become additional vital in education as perceived in trendy Bharat (Das, K., 2021). Some digital learning platforms have advanced assessment talents that modify them to adapt to a lesson dynamically, supported a student’s performance. Some digital learning platforms provide content that’s acceptable for pedagogy knowledge and might be utilized by faculty professors in their courses. Digital content is out there for a range of school, college and university subjects, maths, scientific discipline, economics, science and engineering. Information of the options of technology-rich learning resources is vital because it permits academics to differentiate the qualities and affordances of specific tools in light-weight of education (technological pedagogical) and domain-specific learning (technological content) goals. Voogt et al. (2013) took an outline of fifty-five peer-reviewed journal articles. They found many ways to support teachers’ and pre-service teachers’ TPACK development. In their read, one in every of the foremost vital ways is technology-enhanced lessons or course style.

TPACK Framework
Koehler (2011) Describes the TPACK Framework as Follows

“TPACK attempts to identify the nature of knowledge required by teachers for technology integration in their teaching while addressing the complex, multifaceted and situated nature of teacher knowledge. At the heart of the TPACK framework is the complex interplay of three primary forms of knowledge: Content (CK), Pedagogy (PK), and Technology (TK)” (Koehler, 2011).

The TPACK framework was developed to explain the varieties of information that academics would like if they aim to use technology as a part of their teaching application. There’s content information refers to the topic information. A tutor has concerning the topic if a tutor doesn’t have the required content information. It is the teacher’s responsibility to achieve that information. So as for effective teaching and learning to require place. Online learning is delineated as academic expertise and problems for mistreatment of completely different devices (Das, K. & Das, P., 2020). There’s education information comes from the academics learning Associate in Nursing expertise. It’s the information of however learner learn to show that learners learn optimally and conjointly that kinds of assessment are best for learning. There are Technological information academics ought to have the information of those kinds of technology that can interact and inspire their learners based mostly on how to use those technologies within the room (Koehler, 2011). Since the TPACK framework was adopted to explain the specified information and skills for effective ICT integration into teaching and learning, several researchers have aimed to see whether or not pre-service academics have already got decent TPACK and whether or not any growth in TPACK is measured. Most self-assessment surveys used divide TPACK into a set of the information domains and live the elements of the TPACK framework among pre-service students (e.g., Schmidt et al., 2009).

How can the TPACK Framework be Introduced to better Match Twenty-First Century Pedagogical Needs?

This part of the paper outlines the characteristics of the TPACK framework and also the mensuration instruments offered. The main target of TPACK mensuration instruments is specifically on education views and challenges associated with the current biennial pre-service teacher education program in the Asian nation.

The Seven Knowledge Constructs Area Unit Explained Below (Mishra and Koehler 2006)

Technology Knowledge (TK): This knowledge includes a spread of technologies employed in learning environments from flat solid to advanced technologies.

Pedagogy Knowledge (PK): This knowledge refers to the procedure, practice, or strategies
necessary for teaching and learning like as general schoolroom management methods, course designing, and student assessment.

**Content Knowledge (CK):** Content knowledge is concerning the topic to be learned or educated. Academics should understand and perceive the topics that area unit educated, together with knowledge of facts, concepts, theories, and procedures that area unit specific to a specific space like scientific discipline, biology, and history.

**Technological Education Knowledge (TPK):** It’s required to know general education methods applied to the utilization of technology. However, teaching and learning can amend with the utilization of bound technologies. Academics have to be compelled to exceed these technologies and associate them with instruction.

**Technological Content Knowledge (TCK):** During this knowledge, it’s vital to integrate the technology into teaching. Content knowledge has to be supported by victimization specialized kinds of instrumentality.

**Pedagogical Content Knowledge (PCK):** PCK deals with teaching knowledge possible to a definite discipline. Academics have to be compelled to adapt tutorial materials to understand the students’ needs.

**Technological Education and Content Knowledge (TPCK):** TPCK is the intersection of the three knowledge bases.

The seven components of TPACK are shown in Figure 1.

- To study the relationship between technology and pedagogy content.
- To measure the curriculum and challenges to introducing TPACK.
- To give meaningful suggestions to gain technological skills.

**Methodology of the Study**

This study employs an interpretative approach where qualitative data were collected and analyzed by documenting the research papers from journals, reports, books, edited books, and online documents. The methodology of the proposed study is based on the document analysis and interview method.

**Methodology Employed**

- It is based on qualitative research.
- Data collected by the interview method.
- It has the chief characteristics of recent document-based analytical research.

**Research Materials**

- Government documents,
- Peer-reviewed Journals
- Books,
- Magazines,
- On-line documents from some relevant and reliable internet sources.

**Results & Discussions**

**Lesson plan or Learning Design Reports**

The PSTs (Pre-Service Teachers) were asked to report their lesson plans and experiences to obtain more detailed information about the lessons and presentations they prepared for the micro-teaching lesson plans and real-world school experience stages. They were given a sample to show how to report their lesson plan. They reported their lesson plans and experiences at the end of each presentation.

**Implementation of the TPACK**

TPACK was implemented in three stages: A) Training Course B) Lesson Plans Designed to be used along with Microteaching, and C) School Applications. There is a huge scope to implementation TPACK in a two-year Pre-Service Teacher Education program which started in 2015.

![Figure 1: Technological Pedagogical Content Knowledge (TPACK) (Mishra and Koehler, 2006)](image-url)
in India. This new two-year Teacher’s Training Programme, as prescribed by National Council for Teacher Education (NCTE), is a statutory body of the Indian Government.

A) Training Course: in the training period, TPACK can easily implement in the teaching-learning process. Theoretical and practical is an integral part of this program that can compile with TPACK. It is aimed to create TPACK awareness among PSTs (Pre-Service Teachers), to increase their TK, and to combine TK, PK, and CK. The trainer has two roles: first, to inform PSTs about using ICT tools effectively in teaching and second, to set a precedent for PSTs by presenting sample lesson plans.

B) Lesson Plans Designed: Lesson Plan or Learning Design is a plan used for teaching by Teachers. The present teachers Training Programme conducts four months of practice teaching and also one month of practice teaching as a practicum. There is a big chance to applying TPACK in that perspective.

C) School Applications: This is a full application part of the teaching. Students & Teachers can both be using TPACK with proper guidelines and based on the curriculum. The task of the PSTs is to be gain an understanding of the convenience of the new ICT tools in the curriculum.

Technology Integration

Interviews with the Teacher Educators clarified that based on the detailed information about content, pedagogy and technology skills on their Lesson Plan or Learning Design. Teacher Educators-1 mentioned that,

“According to the present syllabus, I had followed those guides to develop a technology-integrated lesson plan. Also, I created few materials for classroom instruction.” (Interview, Teacher Educators-1)

The above interview statement of Teacher Educators-1 clarifies that some of the teaching tools and teaching materials guided to integrate content, pedagogy and technology for a technology-integrated lesson plan. Teacher Educators-2 mentioned that,

“I just follow-up the current curriculum and trying to assimilate the technology-integrated lesson plan. Sometimes I cannot follow all the technological tools due to a lack of institutional infrastructure.” (Interview, Teacher Educators-2)

Based on the above evidence, it was clarified that technology could not be applying all times or in all teaching-learning environments due to lack of infrastructure facilities. Also, interviewer-2 trying to admit technology-integrated pedagogy in the classroom. Teacher Educators-3 mentioned that,

“I feel that there are no proper guidelines for applying technology in a lesson plan for classroom teaching. Also, pedagogical content and technology can be partially used in classroom teaching-learning.” (Interview, Teacher Educators-3)

Further, based on interviews opinion that there is a lack of proper guideline or instruction about applying technology, pedagogy content in the whole training program. But, it was applying sometimes. Teacher Educators-4 mentioned that,

“I feel very joyful to used technology in learning design and make sure that it was very helpful for all learners. But, the lack of technology devices is a barrier to the learner. I look forward to the present curriculum, which does not mention in a specific case for using the technology-integration.” (Interview, Teacher Educators-4)

Implementation of the TPACK on Lesson Plan

Figure 2: Lesson-plan topics

Figure 2: Front Pages of the Lesson plan in Standard IX Grade of West Bengal Board of Secondary Education

Figure 3: Teaching Content Shifting to Digitalized forms with the help of Technology

The above Figure-2 describes the various techniques which are used for format teaching aids to technology-based teaching aids. Here seen that video clips, audio clips, printed copy and some software are used for that change.
Figure 4: Formal Teaching-Learning Content are Changes to the Technology-based Content in the Lesson Plan

Figure-3 mentioned here the real situation teaching-learning skills shifted to digitalized format. The above figure described that the traditional lesson plan changes to the digitalized forms with Technology-integration. At starting of a class, previous knowledge should be discussed at that time. In that case, teacher use directly internet sources for many data, results, examples, figures and multimedia documents. Classroom teaching use Technological tools, devices, content with proper instructions.

Recommendations

Significant professional development with the use of educational technologies, the introduction in various subject-matter lessons that enjoy the benefits of technology-rich environments and the introduction of technology into day-to-day teaching should be offered to pre-service and in-service teacher educators. Relevant training technologies should be incorporated into the goals, lessons and appraisal of educational objectives in curricula and learning areas at all stages.

Appropriate Pre-Service Teacher Training and In-Service Training and development should aim to ensure open-minded approach to experimenting with ever-evolving technical tools and their widespread effect on teaching. Appropriate technology-based lessons and lesson plans can be included in this curriculum. The implementation of various training methods, such as team-based learning and integrated e-learning programs, may help to optimize the benefit of the stand-alone online learning course.

Limitations

Based on these results, we assume that it is important to further develop and investigate the questionnaires used and to focus on how TPACK is empirically investigated to gain a better comprehension of the nature of TPACK. The second limitation is related to the methods used in this study.

Future Research

This article also provides some insights into the nature of pre-service teachers’ TPACK, proposing ideas for future research. We assume that the knowledge related to the structure and development of pre-service teachers’ TPACK grounded on twenty-first-century skills provides an important starting point to support teacher education and the professional development of pre-service teachers. We assume that a longitudinal approach would be important to define the effects of teacher education and also to highlight the areas where special support is needed within teacher education.

Conclusion

Empirical evidence has shown that pre-service teachers feel that they lack experience integrating ICT effectively into their classrooms. Researchers are currently examining various alternatives that may resolve a range of issues related to the development of pre-service teachers’ ICT competencies in ICT integration (Tondeur et al., 2012). Infrastructure facilities may be effective in introducing TPACK (Das, K. and Roy, D., 2019). TPACK is partially in two-year pre-service teacher education but there is some lack of curriculum shortages are present. Teacher educators are ready to use the technology-integration content and they expect the proper guideline for it.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest concerning the research, authorship, and publication of this article.

References


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