

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 Suwannatthachote (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 is 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.

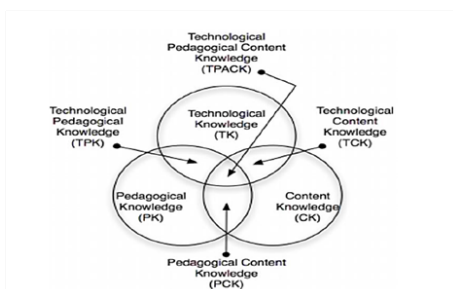


Figure 1: Technological Pedagogical Content Knowledge (TPACK) (Mishra and Koehler, 2006)

Objectives of the Study

- To find out the scope of implementation of TPACK on a Teacher training program.

- 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

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 practicum 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

Materials and equipment/resources	Changes to be related with JOP & Internet	Technology associated: Using JOP & Internet based on MS Office, Paint, Drawing, etc.
a. Paper for drawing three clips	image, picture	integrated content & material by using internet resources
b. A hand made chart about main difference of three three ship system in it.	columnal chart	video clips from youtube, digital, picture, powerpoint, etc.
c. Three hand made boat (to make students attention)	video clips	Audio clips from Internet resources such as powerpoint, wikipedia, youtube, etc.
d. A brief summary	video recording, audio clips	directional objective, example extracted from internet resources.
e. New Information	video clips, power point presentation	

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.

- Das, Kaushik, and Dipanjana Roy. "Infrastructural Facility Faced by Trainee Teachers in New Two Years B.Ed. Program in West Bengal." *International Journal of Research in Social Sciences*, vol. 9, no. 7, 2019, pp. 210-222.
- Das, Kaushik, and Madhurima Gupta. "Action Research on Mathematics Phobia among Secondary School Students." *International Journal of Indonesian Education and Teaching*, vol. 4, no. 2, 2020, pp. 239-250.
- Das, Kaushik, and Piashi Das. "Online Teaching-Learning in Higher Education during Lockdown Period of COVID-19 Pandemic in India." *International Journal on Orange Technologies*, vol. 2, no. 6, 2020, pp. 5-10.
- Das, Kaushik, and Ratna Chowdhury. "Analytical Study on Practice Teaching of B.Ed. Students in B.Ed. Department, Gobardanga Hindu College, under WBSU in India." *International Journal of Scientific Research and Reviews*, vol. 8, no. 2, 2019, pp. 3882-3898.
- Das, Kaushik, et al. "Applications of Mathematical Knowledge in History, Geography, Fine-arts & Physical Education Subjects in Two-year B.Ed. Program: Indian Context." *Journal of Emerging Technologies and Innovative Research*, vol. 6, no. 6, 2019, pp. 8-15.
- Das, Kaushik, et al. "SWOT Analysis of Teacher Educators in B.Ed. Department under West Bengal State University in West Bengal, India." *Research Review International Journal of Multidisciplinary*, vol. 4, no. 6, 2019, pp. 87-91.
- Das, Kaushik. "A Study on Misconception of Using Brackets in Arithmetic Expression." *Shanlax International Journal of Education*, vol. 8, no. 4, 2020, pp. 76-80.
- Das, Kaushik. "Inclusive Mathematics Education in Classroom Practice." *Shanlax International Journal of Arts, Science and Humanities*, vol. 8, no. 3, 2021, pp. 1-5.
- Das, Kaushik. "Integrating E-Learning & Technology in Mathematics Education." *Journal of Information and Computational Science*, vol. 11, no. 1, 2021, pp. 310-319.
- Das, Kaushik. "Job Satisfaction among Educators According to their Socio-Economic Status in the Government Aided and Private B.Ed. Colleges in West Bengal." *Shanlax International Journal of Arts, Science and Humanities*, vol. 7, no. 2, 2019, pp. 11-16.
- Das, Kaushik. "Lack of Mathematical Knowledge in Two-year B.Ed. Programme: Indian Context." *Research Journal of Educational Sciences*, vol. 7, no. 3, 2019, pp. 1-6.
- Das, Kaushik. "Pedagogical Approaches in Mathematics: Indian Perspectives and Practices." *International Journal of All Research Writings*, vol. 1, 2019, pp. 16-21.
- Das, Kaushik. "Realistic Mathematics & Vygotsky's Theories in Mathematics Education." *Shanlax International Journal of Education*, vol. 9, no. 1, 2020, pp. 104-108.
- Das, Kaushik. "Role of ICT for Better Mathematics Teaching." *Shanlax International Journal of Education*, vol. 7, no. 4, 2019, pp. 19-28.
- Das, Kaushik. "Significant of Mathematics Laboratory Activities for Teaching and Learning." *International Journal on Integrated Education*, vol. 2, 2019, pp. 19-25.
- Dumpit, Duvince Zhalimar, and Cheryl Joy Fernandez. "Analysis of the Use of Social Media in Higher Education Institutions (HEIs) using the Technology Acceptance Model." *International Journal of Educational Technology in Higher Education*, 2017.
- Keating, Thomas, and Ellen Evans. "Three Computers in the back of the Classroom: Preservice Teachers' Conceptions of Technology Integration." *Society for Information Technology & Teacher Education International Conference*, 2001.
- Koehler, Matthew J., and Punya Mishra. "What happens When Teachers Design Educational Technology? The Development of Technological Pedagogical Content Knowledge." *Journal of Educational Computing Research*, vol. 32, no. 2, 2005, pp. 131-152.
- Koehler, Matthew J., and Punya Mishra. "What is Technological Pedagogical Content Knowledge?" *Contemporary Issues in Technology and Teacher Education*, vol. 9, no. 1, 2009, pp. 60-70.

- Koehler, Matthew J., et al. "The Technological Pedagogical Content Knowledge Framework." *Handbook of Research on Educational Communications and Technology*, edited by J.M. Spector, et al., Springer, 2014.
- Liao, Yuen-kuang Cliff. "Effects of Computer-assisted Instruction on Students Achievement in Taiwan: A Meta-analysis." *Computers & Education*, vol. 48, no. 2, 2007, pp. 216-233.
- Margerum-Leys, Jon, & Ronald W. Marx. "Teacher Knowledge of Educational Technology: A Study of Student Teacher/Mentor Teacher Pairs." *Journal of Educational Computing Research*, vol. 26, no. 4, 2002, pp. 427-462.
- McKenney, Susan, and Joke Voogt. "Designing Technology for Emergent Literacy: The PictoPal Initiative." *Computers & Education*, vol. 52, no. 4, 2009, pp. 719-729.
- Mishra, Punya, and Matthew J. Koehler. "Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge." *Teachers College Record*, vol. 108, no. 6, 2006, pp. 1017-1054.
- Niess, M.L. "Preparing Teachers to teach Science and Mathematics with Technology: Developing a Technology Pedagogical Content Knowledge." *Teaching and Teacher Education*, vol. 21, 2005, pp. 509-523.
- Pierson, Melissa E. *Technology Integration Practice as a Function of Pedagogical Expertise*. Arizona State University, 1999.
- Rotherham, Andrew J., and Daniel Wilingham. "21st Century Skills: The Challenges Ahead." *Educational Leadership*, vol. 67, no 1, 2009, pp. 16-21.
- Roy, Dipanjana, and Kaushik Das. "Job Satisfaction among Female School Teachers in North 24 Parganas, West Bengal." *Journal of Xi'an University of Architecture & Technology*, vol. XII, no. VII, 2020, pp. 271-281.
- Sande, E., et al. "Supporting Executive Functions during Children's Preliteracy Learning with the Computer." *Journal of Computer Assisted Learning*, vol. 32, no. 5, 2016.
- Schmidt, Denise A., et al. "Technological Pedagogical Content Knowledge (TPACK): The Development and Validation of an Assessment Instrument for Preservice Teachers." *Journal of Research on Technology in Education*, vol. 42, no. 2, 2009, pp. 123-149.
- Shulman, Lee. "Knowledge and Teaching: Foundations of the New Reform." *Harvard Educational Review*, vol. 57, no. 1, 1987, pp. 1-23.
- Shulman, Lee S. "Those who Understand: Knowledge Growth in Teaching." *Educational Researcher*, vol. 15, no. 2, 1986, pp. 4-14.
- Takacs, Zsofia K., et al. "Benefits and Pitfalls of Multimedia and Interactive Features in Technology-Enhanced Storybooks. A Meta-Analysis." *Review of Educational Research*, vol. 85, no. 4, 2015, pp. 698-739.
- Tantrarungroj, Pornsook, and Praweenya Suwannathachote. "Enhancing Pre-service Teacher's Self-efficacy and Technological Pedagogical Content Knowledge in Designing Digital Media with Self-regulated Learning Instructional Support in Online Project-based Learning." *Creative Education*, vol. 3, 2012, pp. 77-81.
- Tondeur, Jo, et al. "Preparing pre-service Teachers to Integrate Technology in Education: A Synthesis of Qualitative Evidence." *Computers & Education*, vol. 59, no. 1, 2012, pp. 134-144.
- Voogt, J., et al. "Technological Pedagogical Content Knowledge - A Review of the Literature." *Journal of Computer Assisted Learning*, vol. 29, no. 2, 2013, pp. 109-121.

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