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RESEARCH ARTICLE

INVESTIGATING STAFF MEMBERS' TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE AT THE FACULTY OF EDUCATION, ZAGAZIG UNIVERSITY

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ABSTRACT

This article aimed at investigating staff members' technological pedagogical content knowledge at the Faculty of Education, Zagazig University. The participants were 16 staff members from the Faculty of Education, Zagazig University. The researcher adopted quasi experimental design method. To achieve the aims of the study, the researcher designed Staff Members' Technological pedagogical content knowledge Questionnaire (TPACK) at the Faculty of Education, Zagazig University. The results showed the important connections between pedagogical training and selection of suitable technology, and between personal technology use and the choice of proper technology. Hence, this study recommends that staff members should continue to model the use of technology so that their students can increasingly update their technological knowledge through observation and learning.

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INTRODUCTION

Teachers who are both professional and skilled are essential for a country's success. In-service and pre-service teacher education is a major problem. It's challenging to characterise instructors' expertise in the context of 21st-century education requirements, given the widespread usage of technology. There are no rules that show how teacher knowledge should be understood or what instructors should have in their classrooms (Goodwin & Kosnik 2013). Shulman (1986) proposed a paradigm concentrating on the teacher's subject knowledge, known as Pedagogical and Content Knowledge (PCK), which shows the relationship between content and pedagogy. In his model, he focuses on three areas: pedagogical expertise (PK), Content knowledge (CK) and pedagogical content knowledge (PCK) are two types of knowledge (PCK).

PCK is the knowledge of teaching tactics for a certain subject in various circumstances, as well as the understanding of content structures, illustrations, and examples in order to make information more intelligible (Shulman 1986). Shulman's (1986) PK was refined by Voss, Kunter, and Baumert (2011) by incorporating the psychological domain, resulting in pedagogical/psychological knowledge (PPK), which defined the classroom as a social community. CK, PPK, and PCK were the three sections of the structure. Knowledge of classroom management, teaching methods, classroom evaluation, and learning processes, as well as individual characteristics, are required to finish CK and PCK. Other scholars have built on the paradigm presented by Voss *et al*. (2011). Grossman (1995) and Phillips *et al*. (2009), for example, added a fourth dimension of contextual knowledge. They informed model circles in this framework that encompassed content, pedagogy, and context domains, culminating in the construction of seven areas of knowledge: CK, PK, PCK, context knowledge,

content in context knowledge, pedagogical context, and PCK in context (Grossman, 1995; Phillips *et al*., 2009). The dynamic nature of interactions between CK, PK, and TK in TPACK makes them interdependent. The ability to use proper tools to educate successfully with technology impacts the success of a lesson. Teachers must have a degree of understanding to smoothly integrate topic knowledge, pedagogy, and technology in the teaching process while using inquiry-based learning, which is a basic technique in the teaching of science. Many dialogues have been facilitated by TPACK in a variety of teacher education programmes, and material priority have been restructured based on TPACK components (Niess, 2005; Niess *et al*., 2009). All elaborated models were developed using Shulman's (1986) PCK framework, which has been reported by several scholars. As technology has advanced at a rapid pace, Mishra and Koehler (2006) developed a new framework based on Shulman's (1986) paradigm, which expanded technology to include content and pedagogy. Studying how technology is pedagogically utilised to teach content is particularly essential in 21st-century education, according to Mishra and Koehler (2006). They named their framework TPACK, which consists of seven domains depicted as overlapping circles in a Venn diagram. The TPACK framework's three rings represent fundamental fields of teacher knowledge: Technology Knowledge (TK) is abbreviated as CK.

Why is it necessary to research in-service teachers? The majority of TPACK research has focused on pre-service instructors (Mouza, 2016). There hasn't been much research done on in-service instructors (Chen and Jang, 2016). The research gap raises concerns regarding instructors' capacity to dynamically adjust their teaching expertise to meet new learning demands. For example, in the current Covid-19 epidemic, when instructors are unnaturally compelled to find other forms of teaching remotely, the use of technology to educate has come under fire. According to previous study, in-service instructors, particularly those with extensive teaching experience, Teachers with less teaching experience tended to think of their Technological Pedagogical Content Knowledge as being poorer (Lee & Tsai, 2010). Although Jang & Tsai (2012) found that instructors with more teaching experience had greater CK and PCK than teachers with less teaching experience, in a situation where remote teaching is the sole means to offer instruction, the ability to recognise the TPACK components becomes even more important. As a result, the purpose of this study is to see if science instructors in Sarawakhavedifferentlevels of teacher knowledge,based on the TPACK framework, and if their teaching experience differs. Meanwhile, the four overlapping domains elaborate on the three rings' integration (Mishra & Koehler 2006). Teachers' knowledge of technologies that might be used in education is referred to as TK. Teachers' awareness of the circumstances necessary for learning, as well as common teaching methods, is referred to as PK. Meanwhile, CK refers to the professors' knowledge of the topic (Mishra & Koehler, 2006). TCK is subject matter knowledge integrated via technology; TPK is knowledge of integrating technology for teaching methods; PCK is knowledge of teaching methods in various subject contexts; TPACK is knowledge of integrating technology for teaching methods in various subject contexts. There have also been various efforts to use the model to measure instructors' TPACK growth (Koehler & Mishra, 2005). Quantitative approaches have been used for a variety of purposes, including assessing the level of TPACK among teachers, evaluating the outcome of a TPACK-based intervention programme, testing the validity of TPACK knowledge constructs, and investigating interaction relationships between TPACK knowledge components. Researchers frequently employ survey methods, which entail gathering data via questionnaires including knowledge-related questions and incorporating technology into the teaching and learning process (Koehler *et al*., 2012). In the early phases of TPACK research, the goal was to create a questionnaire that could test each component or construct of TPACK knowledge (Koehler & Mishra, 2005; Schmidt *et al*., 2009). The data on teacher self-evaluation of TPACK was subsequently collected using these tools. Schmidt *et al*. (2009) created a 58-item Survey of Pre-service Teachers' Teaching and Technology Knowledge. It looked examined how pre-K-6 teachers felt about TPACK in the areas of math, social studies, science, and reading.

Context of the problem: The success of pupils and a subsequent school of human capital that will be born in the future is largely determined by the quality of teacher teaching. The teacher's ability to impart knowledge, concepts, and abilities to students in an inspiring atmosphere is determined by the teacher's quality of teaching. Teachers who are qualified play an important part in determining the degree of teaching appropriateness and the strength of the pupils in front of them. Because a high level of teaching is provided to students who are at a low level, they will become bored and lose their attention if a high level of teaching is given to students who are at a low level. According to Slavin (1987), in order to absorb, grasp, and focus on what they are learning, pupils must be classified according to their intellectual aptitude. The goal of 21st-century teaching and learning is to allow professors and students to collaborate in the classroom so that clever students may assist their classmates (KPM, 2012). The main purpose of this article was to determine staff members' education TPACK level. Furthermore, investigate their perceptions about the value of school experiences courses, the reasons for choosing their professions and their possession of different technologies. So, this study was an attempt to find answers to the following questions:

- What isthe staff members' technological pedagogical content knowledge at the Faculty of Education, Zagazig University (TPACK)?
- Is there a significant relationship between their computer training sessions and their TPACK scores?

Procedures of the study

- Reviewing the literature related to the variables of the article.
- Designing the instrument of the article (Staff Members' Technological pedagogical content knowledge Questionnaire (TPACK) at the Faculty of Education, Zagazig University)
- Submitting the instrument to a number of jury members to validate them.
- Choosing the participants.
- Administering the instrument to the participants.
- Stating the results and treating them statistically.

Significance of the study: Changes in the curriculum are at the forefront of education's agenda as it strives to achieve a worldwide level of globalisation.

The instructor plays the most significant role in any modification in the educational system. In order to align with the 4th Industrial Revolution, instructors must adapt to the most recent technology advances and requirements. Instructors must be prepared with a shift in knowledge and technology in order to educate today's Z generation. This is because the technological revolution significantly transforms people's lifestyles. Staff members must undergo personal modifications in order to guide students into global technology as role models.

Aim of the study: This article aimed at investigating staff members' technological pedagogical content knowledge at the Faculty of Education, Zagazig University

Method of the study: The researchers adopted quasi experimental design.

Delimitations of the study: This study was delimited to a sample of staff members at the Faculty of Education, Zagazig University. It was also delimited to staff members' technological pedagogical content knowledge at the Faculty of Education, Zagazig University. This study was carried out in 2021.

Definition of terms: The understanding that comes through interactions between content, pedagogy, and technology is known as technological pedagogical content knowledge (TPACK). The foundation of effective technology-assisted education is TPACK. https://citejournal.org/volume-9/issue-1-09/general/what-is-technological-pedagogicalcontent-knowledge/. Technological pedagogical knowledge (TPK) describes relationships and interactions between technological tools and specific pedagogical practices, while pedagogical content knowledge (PCK) describes the same between pedagogical practices and specific learning objectives; finally, technological content knowledge (TCK) describes relationships and intersections among technologies and learning objectives. These triangulated areas then constitute TPACK, which considers the relationships among all three areas and acknowledges that educators are acting within this complex space. https://educationaltechnology.net/ technological- pedagogical- content-knowledge-tpack-framework/

RESULTS

The results of the present article showed the important connections between pedagogical training and selection of suitable technological devices in the process of teaching and learning, and between personal technology that the staff members use and the choice of proper technology during lectures.

Hence, this study recommends that staff members should continue to model the use of technology so that their students can increasingly update their technological knowledge through observation and learning. Staff members' expertise may be improved, which aligns with KPM's goal of improving teaching professionalism through college-based instruction. The parts of the Knowledge Pedagogy Knowledge Technology framework are crucial in making RBT staff members' instruction appealing.

Conclusion

Clinical supervision should concentrate on how staff members acquire integrated understanding of course content through the use of technology to attract students. Individual emotive, cognitive, and psychomotor domains can all benefit from engaging staff members instruction. This can help students become more creative and critical in the future.

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