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Research Article

Investigating Faculty Technological and Pedagogical Content Knowledge: The BiPSU Context

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ABSTRACT

One of the components that shape the educational system is the instructor. They do several tasks at school that significantly impact students' character, value system, principles, and the character of the entire population. Because of the teacher's position in the classroom, the need for teacher professionalism, discipline, competence, commitment, and innovation is crucial for teachers to contribute to the country's educational aim of obtaining an exceptional education. Per the recommendations of the Accrediting Agency of Chartered Colleges and Universities in the Philippines, this study surveyed 31 faculty members in the School of Arts and Sciences department. It evaluated their competency in integrating technology into pedagogical content using Johnson's (2001) cross-sectional descriptive design. Using the updated TPACK (Technology, Pedagogical, and Content Knowledge) instrument developed by Valtonen et al. (2017), the study found that liberal arts faculty understand how various technologies can be used in the classroom. They also recognized that incorporating technology into the classroom may change their teaching. A strong relationship was found between teachers' service length, pedagogical knowledge, sex, and technological knowledge. It was suggested that school administrators prioritize program and investment strategies that develop an experienced teaching workforce of high-quality individuals. It is also advised that the faculty of the School of Arts and Sciences engage in activities that optimize Information and Communication Technology (ICT) to increase their content knowledge, professional growth, and professional learning.

Keywords*: Biliran province, Competence, ICT, Innovation, TPACK*

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Introduction

The teacher is one of the components that shape the educational system. They fulfill a variety of jobs in school that have a considerable impact on the character, value system, and principles of students and the character of the entire populace. Teaching is an art form, and as with other arts, it requires dedication, awareness, humor, comprehension, proper training, and plain old hard labor. It is a financial investment equal to everything one invests in it. Teaching is one of the earliest recognized learned professions, and in terms of age, it is comparable to the disciplines of law, medicine, and ministry. Because as Guevarra (2017) notes, when teaching occurs, a unique human connection develops, a relationship with multiple dimensions that affects the learner concurrently. Due to the teacher's vital role in the classroom, the requirement for teacher professionalism, discipline, competence, devotion, and innovativeness is critical for teachers to contribute to the country's educational goal of achieving an excellent education. As a result, educational policymakers have prioritized teacher quality (Yee & Normore, 2013).

The CHED Internationalization Policy's goal of improving educational quality and producing competitive human resource capital capable of adapting to shifting regional and global demands was highlighted in the CHED Memorandum Order 46 series of 2012, titled Internalization as a Quality Strategy. The goal is to support and sustain the country's economic progress by enhancing the quality of education, as evidenced by an increasing number of graduates with usable skills in both local and international labor markets, global perspectives, and an adaptive mindset. Additionally, CHED's internalization strategies seek to improve the quality of Philippine higher education, (i) maintain the country's reputation as a center of excellence in identified niches/programs of excellence, (ii) strengthen the country's role in an interconnected global community, (iii) develop Philippine HEIs as productive members of the international academic community, and (iv) produce graduates with 21st-century competencies capable of living and working in a diverse/multicultural setting. These objectives may be accomplished if faculty members adhere to the high standards of performance required in higher education.

There are new expectations for today's schools and teachers due to the enormous economic changes brought about by the development of information and communication technology (ICT) (Valtonen et al., 2017). Teachers must be competent in pedagogy, technology, and content knowledge to ensure that students learn 21st-century skills to deal with the constantly evolving technological advancements in this digital era. This study is based on the Technological Pedagogy Content Information (TPACK) theory, designed to describe teachers' knowledge to teach their students and utilize technology effectively. However, teachers at school each have their quirks and characteristics that identify them from one another (Alufohai & Ibhafidon, 2015).

The School of Arts and Sciences of Biliran Province State University profile revealed that just 35% of its staff members are alums of teacher preparation programs while being recognized by CHED as one of the Higher Education Institutions in Region VIII offering Liberal Arts. In comparison, the remaining 65% are degree holders of other disciplines without units of professional education courses. These findings from a previous needs assessment serve as the basis for conducting a faculty capacity-building program focused on designing an OBE-compliant syllabus using a constructive aligning approach. Further, the program equipped the faculty members to apply differentiated instructions in flexible learning, using appropriate ICT tools for an effective teaching-learning process, and to develop the assessment plan. These gather assessment information and use the assessment process to make classroom-related decisions effectively.

In this context, the researcher was prompted to conduct this study to assess the performance of the School of Arts and Sciences faculty members after undertaking the capacity-building program. In order to evaluate the effectiveness of the training program on converting non-education graduate teachers from instructor-centered to learner-centered teaching, the study applied the TPACK technique to evaluate faculty competency in integrating technology into pedagogical content. It also

determined the faculty profile in terms of (i) gender, (ii) age, (iii) length of service, and (iv) field of preparation. Furthermore, it sought to uncover the relationship between the profile and their TPACK competency because Shulman (1986) believed that the typical idea of knowledge in teaching is that teachers have specific knowledge about the subject they are teaching and knowledge about how to teach, including specific teaching methods.

Methods

The study is non-experimental quantitative, employing Johnson's (2001) cross-sectional descriptive design, with 31 faculty members from BiPSU's School of Arts & Sciences serving as respondents. Of the 31 faculty members, 15 (48%) are from Bachelor of Arts in Economics, 6 (19%) are from Bachelor of Arts in Communications, and 10 (32%) are from the Bachelor of Science in Business Administration. The study's nature was to explain a (phenomenon where data was collected over a brief period, thus the cross-sectional descriptive design. The updated TPACK measure for PST's twenty-first-century abilities developed by Valtonen et al. (2017) was used with minimal modifications to contextualize the content for higher education teachers to assess faculty understanding of technological pedagogical content.

The data were evaluated using statistical numerical measures (frequencies, percentages, and mean), and correlation was established using Spearman's rank order correlation coefficient using Statistical Package for the Social Sciences (SPSSv.28).

Results and Discussion

Table 1. Profile of the Respondents

Sex		f	%
	Male	15	48.40
	Female	16	51.60
	Total	31	100.00
Age		f	%
	Above 50 years old	7	22.60
	41 – 50 years old	5	16.10
	31 – 40 years old	8	25.80
	21 – 30 years old	11	35.50
	20 years old and below	0	00.00
Total		31	100.00
	Over 20 years	0	00.00
	10 – 20 years	10	32.30
	5 – 9 years	11	35.50
	2 – 4 years	8	25.80
	1 year and below	2	06.50
	Total	31	00.00
Field of Preparation			
	Education	6	19.40
	Arts and Humanities	2	06.50
	Social Sciences, Journalism, and Information	13	25.80
	Business, Administration, and Law	8	41.90
	Natural Sciences, Mathematics, and Statistics	2	06.50
	Information and Communication Technologies	0	00.00
	Engineering, Manufacturing, and Construction	0	00.00
	Agriculture, Forestry, Fishery, and Veterinaries	0	00.00
	Health and Welfare	0	00.00

	Service (Travel, Tourism, and Leisure) ; (Security, Military Service)	0	00.00
Total		**31**	**100.00**

Table 1 shows the profile of the respondents. The distribution of respondents as to their sex is nearly early equal, with the female group slightly higher than the male group. A more significant portion of the respondents was in the age category 21 – 30 years old, had taught at the university between 5 – 9 years mostly came from the field of preparation in Social Sciences, Journalism, and Information (Philippine Classification of Education, 2017).

Table 2. Faculty's Pedagogical Knowledge

Indicators	M	Description
I can guide students in their discussion during group work	4.58	have good knowledge
I can support students' critical thinking	4.41	have some knowledge
I can guide students in planning their learning	4.58	have good knowledge
I can support students' reflective thinking	4.41	have some knowledge
I can guide students to use each other's thoughts and ideas during group work (2-5 students).	4.51	have some knowledge
I can support students' creative thinking (i.e., think clearly and act intelligently in a new perspective, e.g., brainstorming).	4.45	have some knowledge
Average Mean	**4.49**	**have some knowledge**

Table 2 shows the faculty members' perceptions of pedagogical knowledge at BiPSU-SAS. The findings demonstrated that faculty could support students in organizing their learning and students' conversation during group work by knowing how well they know the processes of learning on a general level. Most faculty members (51.60 percent) said they could help students think creatively and critically. This finding signifies that faculty were able to establish an effective teaching and learning environment for students as a result of the capacity building. Teachers' pedagogical skills are vital since they improve the quality of the teaching process and promote a more profound learning experience (Nadeem n.d.)

Table 3. Faculty's Technological Knowledge

Indicators	M	Description
I can solve ICT related problems (e.g., diagnosing Disconnection issues between computer and projector, poor Internet connectivity, and others).	4.19	have some knowledge
I am familiar with new ICTs and their features.	4.09	have some knowledge

Indicators	M	Description
I can use new technologies in creating class activities (e.g., creating web based experiments for teaching the subject ontent)	4.06	have some knowledge
I know several websites about new technologies	3.9	need a bit of additional knowledge
I can use Communication tools (e.g., WhatsApp, Viber, Skype, F.B. messenger, online chat, and others) in directing activities relating to learning the subject matter	4.77	have some knowledge
I can use social media (e.g., Facebook, Instagram, Twitter, and others) to initiate school-wide activities related to the course content	4.74	have some knowledge
I can use web Based Collaboration tools (e.g., Google Docs, Dropbox, and others).	4.38	have some knowledge
Average Mean	**4.31**	**have some knowledge**

Table 3 shows the findings of the technological knowledge of the BiPSU-SAS faculty. The item with the highest mean of 4.77 states, "I can use communication tools (e.g., WhatsApp, Viber, Skype, F.B. messenger, online chat, others) in directing activities relating to learning the subject matter." In comparison, the one with the lowest mean of 3.9 states, "I know several websites about new technologies." With a general weighted average of 4.31, the teachers "have some knowledge" about technology. Educators should arm themselves with information and technical skills and use technology to enhance teaching and learning (Kasim &Singh, 2017). Kasim and Singh emphasized the relevance of SAS instructors' understanding of how to use digital technologies in the classroom due to the 21st-century learning environment requirement. It will be difficult for them to become teachers in the future because they will need to be able to deal with Gen-learning Z's styles that have been exposed to a broad range of digital tools.

Due to the restrictions imposed by the Covid-19 pandemic, instructors were exposed to various ICT-based capacity-building programs at the university, which encouraged them to develop a strong capability in technological knowledge. According to Ghora and Bhati (2016), more excellent technological abilities among teachers have cleared the door for them to use ICT in the classroom.

Table 4 displays the perceptions of BiPSU SAS Faculty's content knowledge. The statement "I know how to design a course syllabus in general education and core subjects in the course I am teaching" is graded with the highest mean of 4.38. Meanwhile, the lowest mean of 3.29 is for the item "I am familiar with recent research on B.A. Economics / B.A. Communication / B.S. Administration reflective thinking in the subject he/she is teaching."Both, as well as the general weighted mean of 3.89 for the faculty members, fall in the "need a little additional knowledge" interpretation. SAS faculty members are important factors in shaping students' characteristics and motivating them to succeed in their learning activities (Manasia et al., 2020).

Table 4. Faculty's Content Knowledge

Indicators	M	Description
I have sufficient knowledge of the course content	4.22	have some knowledge
I know how to design a course syllabus in general education and core subjects in my teaching course.	4.38	have some knowledge
I know the history and development of essential theories in the course I am teaching	3.87	need a bit of additional knowledge

Indicators	M	Description
I am familiar with recent research on B.A. Economics / B.A. Communication / B.S. Business Administration	3.29	need a little additional knowledge
I know the basic themes of B.A. Economics / B.A. Communications / B.S. Business Administration course that relates to my locality	3.74	need a little additional knowledge
I am familiar with CHED memorandums and Executive Orders related to B.A. Economics / B.A. Communications / B.S. Business Administration	3.41	need a little additional knowledge
I know how to design instructional material to support students' learning in B.A. Economics / B.A. Communication / B.S. Business Administration	4.00	have some knowledge
I know how to design, conduct, and use practical assessment to improve students learning	4.19	have some knowledge
Average Mean	3.89	need a little additional knowledge

To more effectively train teachers, teacher preparation programs should incorporate these two knowledge bases, whether from the standpoint of content or pedagogy. It can describe how subject knowledge should be combined with pedagogy and parts of the teaching process. Learners' lack of grasp of basic economic ideas might be attributed, at least in part, to economics teachers' lack of professional development training in subject knowledge and pedagogy (Schug, Harrison, & Clark, 2012). According to Santos and Castro (2021), to adapt to the needs of each classroom, identify students who are having difficulty, and change how the material is presented to make it more intelligible, instructors must have a solid understanding of the subject matter.

Table 5. *Correlation between the profile and the Practicum Performance of BiPSU Liberal Arts students*

Variables		Correlation Coefficient	*P* - value
Pedagogical Knowledge	Sex	-0.073	.365
	Age	-0.179	.196
	Length of Service	0.410	.021**
	Field of Preparation	-0.079	.354
Technological Knowledge	Sex	.369	.035**
	Age	.022	.458
	Length of Service	.010	.481
	Field of Preparation	-.071	.368
Content Knowledge	Sex	-.100	.316
	Age	.155	.230
	Length of Service	.039	.426
	Field of Preparation	.032	.440

***Correlation is significant at 0.05 level (one-taled)*

Data in Table 5 revealed insufficient evidence to show no significant relationship between the sex of the faculty and their pedagogical and content knowledge. However, at 0.05 significant level, study revealed a strong correlation between the sex of the faculty and their technological competence. This finding would support Chen's (1986) finding that males were more interested in and confident with computers than females. It also revealed a gender gap in computer use, with men having more exposure to computers both in official instructional

settings and in informal ones. Gebhardt, Thomson, Ainley, and Hillman (2019) added that although it is encouraged for teachers to integrate ICT into their lessons, there is evidence that the success of this integration depends in large part on the preparedness of the teachers. This statement is directly related to level of comfort and knowledge with using ICT and their beliefs regarding the significance of ICT in education. Young women in the classroom look up to teachers who use technology well, yet previous research has shown that female teachers are less likely than their male counterparts to use computers alone.

No significant correlation was found between the faculty's age and length of service with their pedagogical, technological, and content knowledge. However, data show a strong association between the length of service that represents an instructor's teaching experience and their pedagogical competence in terms of instructors' pedagogical knowledge. This finding demonstrates that a teacher's understanding of teaching techniques and procedures, such as classroom management, assessment, syllabus creation, and student learning, increases with the length of time spent in the classroom. Kini and Podolsky (2016) assert that teachers become more effective as they gain experience in the classroom. However, there is a variance in teacher effectiveness at all stages of a teacher's career.

Conclusion

To have highly competent and effective teachers in our school is a matter of concern. This truth is complicated to reject, even when combined with additional effects. The performance evaluation with the faculty of the Bachelor of Arts in Economics and Bachelor of Arts in Communications guarantees that BiPSU School of Arts and Sciences classrooms are staffed with highly trained, well-resourced, and motivated persons committed to providing quality education. The faculty is almost evenly split between male and female professors, with the majority ranging in age from 21 to 30. Almost half of them have been at the university for 5 to 20 years and are studying Business, Administration, and Law. This statement implies that many staff is skilled in educating graduates for professions in banking, economic and development planning, and general management.

The study revealed that the liberal arts faculty have some knowledge of how various technologies may be utilized in the classroom. They recognize that incorporating technology into the classroom may alter how they educate (Technological Pedagogical Knowledge). However, the research found that they need more information about the topic area to be understood or taught. They must be more capable of increasing their understanding of the course they will teach and how the nature of knowledge differs for different curricular areas. This finding implies that teachers are still shifting from teacher-centered to learner-centered content in their classrooms. This result implies that instructors in bachelor's degree programs in business administration, communication, and economics need to participate in training programs to improve their content expertise. The duration of a teacher's tenure and pedagogical competence, as well as their sex and technology knowledge, are strongly correlated; thus, school administrators must concentrate on investment and program initiatives that create an experienced teaching staff of high-quality professionals. Studies show that teachers who repeatedly teach the same subject area develop more quickly than those competent in various areas. It is further suggested that the School of Arts and Sciences faculty should engage in activities where Information and Communication Technology (ICT) is maximized to strengthen the faculty's content knowledge, professional development, and professional learning.

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