

# Management Skills of Educational Managers and the Advancement of Technological Pedagogical Knowledge of Teachers in Private Junior High Schools in Davao City

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## ABSTRACT

Technology plays a great role in innovating and renovating contemporary teaching practices. Hence, this study aimed at determining the influence of the education manager's management skills on the advancement in technological, pedagogical content knowledge (TPACK) of teachers in private junior high schools in Davao City. This study utilized a quantitative prediction research design using a survey method. The 205 teacher-respondents chosen using universal sampling answered a two-part validated online survey questionnaire which asks about the educational manager's management skills and the teacher's TPACK. Data were described, analyzed and interpreted using mean, standard deviation, Pearson r, and linear regression. The findings showed a very high level of management skills among educational managers and a very high level of TPACK among teachers. Standard Multiple Linear Regression Analysis using the Stepwise Method and the equation model showed that the educational managers' management skills such as managing acculturation, managing the future, managing teaching principles, and managing teaching methods significantly predict the TPACK of private Junior High School teachers and these five management skills have relatively contributed to the variation of TPACK. Thus, there is a need to strengthen education manager's formation programs focusing on the areas of energizing employees and teacher's training in technology knowledge.

**Keywords:** Leadership behavior, management skills, technological pedagogical content knowledge, TPACK

## THE PROBLEM AND ITS SCOPE

In the ever-evolving landscape of education, the seamless integration of technology into teaching and learning is crucial for schools to thrive. A classroom led by educators possessing diverse skills in information communication and technology holds the key to fostering the 21st-century skills essential for students' development. However, a challenge arises due to educational managers who may exhibit weaknesses in adapting to and utilizing technology effectively. To achieve successful technology integration, educators need to engage in careful planning, acquaint themselves with relevant applications aligned with their subjects, and discern optimal moments to leverage technology for enhancing students' learning experiences.

As schools respond to this challenge, they have experienced multiple contextual problems due to inadequacy of educational managers. These are either teacher issues like; teacher beliefs about technology and limited professional development. The problem could also be financial, like budget constraints and lack of sufficient equipment. These situations are considered management problems. The principal as education managers

must establish the vision and goals for technology in the school. Inadequacy of educational managers in terms of management skills may affect teacher's meaningful use of technology and the overall effectiveness of school. Thus, education managers are expected to provide robust and flexible learning infrastructure and professional development programs focusing on training teachers to do pedagogically sound technology integration (Davies & West, 2014).

Among 31 high-income member countries and economies of Organization for Economic Co-operation and Development (OECD), teachers expressed that they felt unprepared to use information and communications technology (ICT) in their teaching and a sizable minority also said that they lacked any training in such technology. In addition, only 56 percent of the teachers surveyed said that their formal education or training had included the use of technology for teaching, while only 60 percent reported that their recent professional development activities had included the use of such technology (Varkey Foundation, 2020). This has raised questions among policymakers and tech proponents hoping for a greater role for education technology. This issue is related to leadership and management particularly in developing professional knowledge and skills, and the provision of tangible support structures to support the process of teachers' continuous professional growth.

In the national context, problems related to limited learning opportunity for training and absence of technical support staff (Yamamoto & Morioka, 2018), lack of teacher's training and their attitude towards technology (Chua et al., 2020), budget constraints, lack of sufficient equipment and limited professional development derailed the strong incorporation of technology in teaching (Arrieta, 2020). These problems came out as Philippine schools are mandated to integrate ICT and this was further intensified due to the challenge of distance learning brought about by the pandemic. These issues can be resolved by providing several policy actions to fully integrate ICT in education like: added training for teachers, provision of computer infrastructures, integration of ICT in the curriculum in a strategized manner, and lastly a strong leadership (Tomaro, 2018).

In Davao City, the researcher as a principal, personally witnessed the conduct of ill-structured lessons which revealed teachers' ineffective weaving of technology, pedagogy and content in the teaching and learning process. A post-conference with some teachers revealed that they find it difficult and overwhelming to use multiple technologies in their classes due to time constraints. Follow-up and monitoring by the immediate supervisors are important support that could help teachers perform their task efficiently. The researcher believes that this is greatly related to management skills of educational managers. As managers within educational institutions, they should effectively and efficiently create and maintain environments that promote, support, and sustain effective teaching and learning, manage innovations by improving school capacity to perform, so learners can achieve higher levels of performance. Thus, the researcher has an assumption that management skills of educational managers may somehow influence the advancement of the technological and pedagogical knowledge of the school.

It is in this context that the researcher intends to conduct this study to determine which indicator of educational managers' management skills significantly influence the technological pedagogical content knowledge (TPACK) of private Junior High Schools teachers in Davao City.

Furthermore, this study intends to provide an important foundation for ongoing research and dialogue regarding the advancement of the technological pedagogical knowledge of schools. This study may also put forth change in the responsibilities of the educational leaders and suggests new demands on their management skills.

### **Rationale of the Study**

The worldwide school closures due to the Covid19 pandemic, forces schools to adjust to new educational

concepts and modes of conveyance of teaching like distance learning (Schleicher & Reimers, 2020).

Schools are confronted with responding to the shifting classroom environment brought about by the necessity for having online distance learning. Educational institutions, particularly private schools, had to cope in understanding and designing purposeful classroom technology integration across subject areas.

As the demand for school improvements increases, there is a growing need for principals to cultivate broad based, skillful participation in the work of management. It is important for educational leaders to recognize the significance of their role in technology implementation and utilization. The management skills of administrators play a great role in school (Lewis, Asberry, Dejarnett & King, 2020). Principals as education leaders should develop a shared vision for how technology can support learning and how to secure appropriate resources to sustain technology initiatives. This includes setting the context for technology in the school, designing plans to restructure learning environments and empower teachers and students to be technologically smart (U.S. Department of Education, 2017). As technology leaders, they should also be proficient in the use of technology and then provide leadership in the use of technology for administrative, instructional, and learning functions

In relation to this, Le Bas, Mothe, Nguyen-Thi (2015) surmised that organizational innovation influences technological innovation persistence. This means that organizational practices exert a crucial effect on product innovation persistence. Teachers are more likely to use technology in their instructions once they get technical and instructional assistance, or they are encouraged and appreciated for his or her successful use of technology. These supports are a part of management, which is necessary in any reform initiative.

Furthermore, Machado and Chia-Jung Chung (2015) stressed that principals who created a school vision for effective technology integration and provide teachers with ongoing supportive professional development were found to be most effective. School policy certainly flows from the top down and the overall focus of instruction and lessons comes from the onsite administrator; the principal. Therefore, the attitudes toward and the effectiveness of technology integration in classrooms is undoubtedly affected by the principal's vision for their school.

Moreover, Courville (2011) surmised that successful integration of technology in a school system needs expert individuals who will assume management roles and promote technology for educational purposes. In addition, Thannimalai, and Raman (2018) emphasized that the principals' technology leadership have a specific influence on teacher technology integration. As leaders exhibit more positive management skills, the more engaged, the teachers would be in their instructional task. This study intended to prove or disprove the claim for additional literature.

The technological and pedagogical knowledge of teachers is a well-researched topic using the TPACK framework. However, studies were limited to assessing teacher TPACK in their subject areas, such as mathematics, science, social studies (Kafyulilo & Fisser, 2019; Akman & Guven, 2015). Only a few of this research dwelt on the technological pedagogical advancement of schools as influenced by management skills of educational managers in the Philippines, particularly in Davao City. This reality inspires the researcher to pursue this study because she firmly believes it will provide literature on the said variables. This study endeavors to address the gap by exploring the significant relationship of the management skills of educational managers and the advancement of technological pedagogical knowledge of teachers in private junior high schools in Davao City.

There is an urgency to conduct the study to help educational managers in developing a good source of input in effective planning and organizing personnel development programs for teachers to effectively teach with technology and facilitate strong educational technological practices for them to respond fully to the

challenge of the times.

This study may be beneficial to the following group of people:

*Department of Education Program Implementers.* This study may provide them additional literature on education manager's management skills, which influence the technological pedagogical knowledge of private junior high schools. This may also help them in planning, developing and implementing management programs for all education managers nationwide. Eventually, the school's management programs will be improved and the teacher's technological pedagogical knowledge through the effectiveness of education managers management skills will also be nurtured.

*Principals.* They may use the results of this study as bases to improve their managerial competency. This will also serve as their guide in the proper planning, assessing and evaluating their technology programs. Furthermore, this will provide school heads with necessary insights as one of the bases in designing functional and relevant managerial plans and faculty development programs. This will also guide them in analyzing the implications of the educational manager's management skills and its influence on the school's technological pedagogical advancement and advance the intellectual, social, and emotional upbringing of their clientele.

*Teachers.* This may provide teachers a framework for the effective integration of technology in education and structuring of their classrooms for the best educational experience for students. This would also help them develop concrete understanding on the importance of teaching the subject effectively with the integration of technology to the teaching- learning process. They may find this beneficial since they are involved in making the teaching and learning process more concrete, relevant and engaging.

*Researchers.* This may serve as additional literature about the leadership behavior and management skills of educational managers as it influenced the advancement in teachers' technological pedagogical knowledge. The result of the study may also be used as secondary data for future related research endeavors.

### **Statement of the Problem**

This study was conducted to determine the management skills of educational managers which significantly influence and predict the technological pedagogical content knowledge (TPACK) of teachers in private Junior High Schools in Davao City covering the school year 2020-2021 and using a multiple linear regression equation model. Specifically, it sought to answer the following questions:

Specifically, this study answered the following questions:

- What is the level of management skills of educational managers in terms of:
  1. managing acculturation;
  2. managing the control system;
  3. managing coordination;
  4. managing competitiveness;
  5. energizing employees;
  6. managing customer service;
  7. managing teams;
  8. managing interpersonal relationships;
  9. managing the development of others;
  10. managing innovation;
  11. managing the future;

12. managing continuous improvement;
13. managing teaching principles; and
14. managing teaching methods?

- What is the level of the technological pedagogical content knowledge (TPACK) of teachers in private Junior High Schools in terms of:
  1. technology knowledge (TK);
  2. content knowledge (CK);
  3. pedagogical knowledge (PK);
  4. pedagogical content knowledge (PCK);
  5. technological content knowledge (TCK);
  6. technological pedagogical knowledge (TPK); and
  7. technological pedagogical content knowledge (TPCK)?
- Is there a significant relationship between the management skills of educational managers' and the technological pedagogical content knowledge (TPACK) of teachers in private Junior High Schools?
- Is there a management skill of educational managers that significantly influence the technological pedagogical content knowledge (TPACK) of teachers in private Junior High Schools?
- What is the best regression equation model which could be derived from the management skills of educational managers' that significantly predicts the technological pedagogical content knowledge (TPACK) of teachers in private Junior High Schools?

## Hypotheses

The following null hypotheses of this study were tested at .05 level of significance.

H<sub>0</sub>1. There is no significant relationship between the management skills of educational managers and the technological pedagogical content knowledge (TPACK) of teachers in private Junior High Schools.

H<sub>0</sub>2. There is no management skill of educational managers that significantly influence the technological pedagogical content knowledge (TPACK) of teachers in private Junior High Schools.

## Review of Related Literature

This part deals on the discussions of literature and studies that support this study, and concepts and theories which relate to the variables. The independent variable of this study is the management skills of education managers, and the dependent variable is technological pedagogical knowledge of teachers in private junior high schools. Synthesis of the literature, studies, concepts, and theories discussed is provided in this part.

## Management Skills

A manager is a person within a formal organization who has at least one subordinate. The task of a manager is essentially similar in all organizations. The common definition of manager limits the role of the manager to only planning, organizing, staffing, directing and controlling the work of subordinates (Salvador & Geronimo, 2011). Management tasks include, setting direction, aims and objectives; planning towards a goal; efficiently organizing available resources; controlling the process; and setting and improving organizational standards (Adegbesan, 2011). Related studies would show that the educational managers' management skills influence the advancement of technological and pedagogical knowledge of schools.



*Managing Acculturation (MA).* Part of the educational manager's role is to manage acculturation, which requires a great deal of knowing their subordinates. Cultural Strength refers to a culture formed out of the pattern of values and beliefs shared by the organization's members (Cameron & Quin, 2011). An important role of education managers is to ensure that the teaching and learning experience is grounded on sound principles. Thus, they have the primordial role to develop positive beliefs of teachers towards any curriculum development that is anchored on innovative teaching principles.

Moreover, teachers' beliefs about teaching goals and practices are influenced by several factors, including teaching and mentoring experiences (Uibu, Salo, Ugaste, & Rasku-Puttonen, 2017) and their individual readiness is in turn influenced by school readiness (Petko, Prasse & Cantieni, 2018). School readiness includes educational technology resources in classrooms, perceived importance of technology integration, goal clarity, head teacher support, as well as formal and informal exchange among teachers. This implies that educational managers could significantly influence teachers towards adopting innovative practices in technology and pedagogy.

Jingxian Wang, Tigelaar, Admiraal (2019) argued that school-level factors which include availability of ICT infrastructure, software and school leadership, school ICT policy is not associated with the teacher's use of digital educational resources. However, higher levels of attitudes, knowledge and skills, better facilitating conditions, and teachers' age and teaching experience are factors that significantly explained teachers' use of digital educational resources. This implies that the teacher's technological pedagogical knowledge, specifically on the use of digital educational resources is not related with the teacher's use of digital educational resources.

*Managing the Control System.* To achieve the organization's vision, mission, and goals and to create an appropriate organizational structure, education managers execute effective organizational control systems. According to Edwards, Try, Ketchen and Short (2015), organizational control systems allow school managers to track how well the organization is performing, identify areas of concern, and then take action to address the concerns. This could be done by establishing output control which focuses on results, and behavioral control which focuses on controlling the actions that ultimately lead to results. School managers must ensure that control systems are maintained and enhanced by using various rules and procedures like efficiently organizing available resources; controlling the process; and setting and improving organizational standards (Adegbesan, 2011).

In setting organizational standards, Hyun and Sajjad (2018) propose to use a proper system or an accurate performance evaluation that may be utilized to track teacher's growth. School managers using a well-defined performance evaluation-based system on clear and reasonable criteria is part of the instructional supervisory role of education. Thus, if the goal is for teachers' advancement in the use of effective teaching strategies and technology integration, educational managers should ensure that the teachers receive timely feedback on their teaching performance based on the evaluation tool (May, Abdurrahman, Hariri, Sowiyah, & Rahman, 2020).

*Managing Coordination.* Managing coordination is fostering coordination within the organization as well as with external units and managers, and sharing information across boundaries (West-Moynes, 2012). For proper coordination, accessibility, and prompt delivery of messages throughout the organization, it is important to simplify complex information. Communication styles play a crucial role in the teachers' performance (Khezeli, 2016), in the smooth running of schools as well as enhancing school effectiveness (Akinwale & Okotoni, 2019) and these are critical to sustain the motivation of teachers and their self-efficacy (Ozeren, Arslan, Yener, & Appolloni, 2020). As pointed out by Ozeren et al. (2020), teachers' willingness to accept the technology and use it for the teaching activities motivation Thus, with proper coordination, issues related to teacher motivation using technology could be addressed.

Moreover, an open communication and established coordination system is necessary to respond to external issues like teacher's attitude towards technology (Chua et al., 2020). When school managers perform their role of setting the school direction, aims and objectives and planning towards a goal, it communicates to teachers what is expected of them (Adegbesan, 2011). Thus, when there are higher levels of relational coordination it leads to higher levels of the quality of education (Sánchez, Heredero, Merodio, Ramírez & Sanz, 2021).

*Managing Competitiveness.* Managers should foster a sense of competitiveness that helps members of the work group perform at higher levels than members of other units. Competitiveness criteria in school organizations are needed by each teacher to be part of translating community expectations (Sitorus, Sihotang, Hutabarat, Daryanto, 2020). To meet such expectations, school leaders may provide creative trends in the formation of professional and pedagogical culture of the teacher including the creation, development and use of pedagogical innovations as these are means for updating educational policy in the area of training a skillful teacher (Zivitere, Riashchenko & Markina, 2015). The development of pedagogical creativity is therefore an important area for creating conditions for a successful educational work which leads to competitiveness.

In addition, Porter (2019) stressed on the important role of principal behavior in managing competitiveness as it has a positive effect on teacher performance. The personal characteristics and high level of skills manifested by a school principal optimizes school performance (Hutton, 2017). Hence, the principal must be a model that inspires teachers. To spearhead the adoption of the uncertain and volatile digital era, school principals have to undertake expected paradigm shifts in their roles to become technology leaders (Stravakou & Lozgka, 2018; Raman, Thannimalai & Ismail, 2019). This only proves that school leaders propel educators towards the 21st century teaching and learning pedagogy to enhance the quality of education.

*Energizing Employees.* Teachers do a better job when constantly energized. Energizing means that there are mechanisms in school that establish ambitious goals and challenge subordinates to achieve performance levels above the standard. A key factor that ensures the success of an organization is the manager's management skills. Employees are inspired by leaders to improve their job performances and stimulate them to perform beyond their job requirements (Nawoselng'ollan & Roussel, 2017).

Moreover, Hartinah, Suharso, Umam, Syazali, Lestari, Roslina and Jermittiparsert (2020) added that there is improvement in the teacher's performance when they are in a conducive work environment. Educational managers set the tone in school, so when they foster such environment, it influences teachers' sense of achievement, increased self-confidence (Kimball, 2016), increased achiever motivation (Patimah, 2017), persistent effort (Macartney, McMillan & Petronijevic, 2018) and positive beliefs about technology (Albirini as cited by Gilakjani, 2017).

*Managing Customer Service (MCS).* Customer service refers to the basic and strategic values that are directed toward identifying and meeting the needs and goals of clients and customers (Cameron & Quinn, 2011). In the school context, the desired goals and outcomes is the provision of a quality education system that is relevant to the needs of students and fosters their ability to acquire knowledge and the needed 21st century skills (Cabardo, 2016). To meet such school goals, education managers are expected to supervise classes and check the quality of teacher performance. This act ensures visibility and assures students and teachers that there is someone they can go to when they experience difficulty (Winn, 2018). Consequently, teachers with effective supervision of academic activities tend to have better teaching performance than with relatively poor supervision (Masao, 2017).

Moreover, as stewards of learning, principals are expected to communicate the value and purposes

consistently to staff, students, parents, school board members, and other policy makers. Believing that teacher learning is an integral part of school improvement, monitoring teachers' application of sound pedagogy in technology integration is important to better inform education policies.

*Managing Teams (MT)*. Coordinated teamwork refers to how well the efforts of individuals and groups within the organization are unified and sequenced. In the study conducted by Tabassi, Roufechaei, Bakar and Yusof (2017), it shows that team condition has a significant direct and indirect impact on team performance. Teamwork can broaden the team's collective knowledge base, and consequently improve team effectiveness (Benoliel & Schechter, 2018). School managers play a direct role in unifying school effort in effecting changes in teaching by providing support to teachers and establishing partnerships and collaboration, this contributes to building teacher capacity in the utilization of ICT for education (Agbo, 2015).

Similarly, Mwawasi (2014) suggests that school leaders provide finances and technological infrastructure, social and moral support to all the school stakeholders to realize the full potential of ICTs in education. School managers, as team leaders, must organize training that is understood by teachers which involves them. When this is done, teachers would feel empowered, as they have established such a connection with the team. The lack of teamwork leads to negative behavior and can bring challenges like delay in implementation of policies (Gombakomba, Oyedele, Chikwature & Oyedele, 2017). A manager's role is very crucial to lead the team, motivate and inspire employees to achieve better performances in all areas including the adoption of innovative strategies in technology integration.

*Managing Interpersonal Relationships (MIR)*. The success of school administrators is closely related to their knowledge and skill in interpersonal and group relations. Berscheid and Regan (2016) emphasized that a strong interpersonal relationship helps nurture a support system within groups, which is why it is important for a group leader to be able to understand and reconcile the strengths and weaknesses within their group. One way of showing interpersonal relations is by treating teachers with respect (Balyer, 2017). By respecting teachers, they are empowered and can discover their potential and limitations for themselves as well as developing competence in their professional development. This makes teacher empowerment a crucial issue. A positive attitude of school leaders towards implementation of ICT will encourage the school community to be actively involved in its implementation (Weng & Tang, 2014).

*Managing the Development of Others (MD)*. Professional development plays a vital role to establish the teachers' future. The advanced knowledge of teachers would lead to increased productivity. Reddy (2015) posits that professional development will guide teachers towards an improved and better teaching. Improving themselves regularly would make them effective and productive. Management shows their support to teachers through organizing professional development activities. This will create a well-informed teaching force on the current education policies, programs, and strategies.

On the other hand, Appova and Arbaugh (2018) underscores the importance of professional development that focuses on quality rather than quantity of teachers' learning as this discourages teachers to pursue high-quality PD. Moreover, aside from providing professional development, school managers may also provide stipends/resources to teachers as they pursue their PD outside their contract hours. Providing teachers with these incentives will motivate teachers and would show a genuine investment in/appreciation of teachers' learning.

*Managing Innovation (MI)*. In the rapid transformation of teaching scenarios, managers should be able to manage change in an organization. This may start with the conduct of needs analysis, aligning proposals based on the data gathered and arranging this according to priority. Leaders in an organization have to set



priorities and gather needed information for the changes like integration of technology to successfully happen (Montejo, 2017). Teachers and schools are saddled by the digital divide due contextual factors such as cost, time, beliefs, (Johnson, Jacovina, Russell & Soto, 2016; Crompton, 2015; Avidov-Ungar & Shamir-Inbal, 2017). Education managers had to gather these data before instituting changes.

Furthermore, Baturay et al. (2017), emphasized that managers should ensure that necessary technologies are provided as enhanced technological knowledge translates into increased use of a variety of technologies in the classroom. Teachers do not mostly welcome innovations in school, especially in ICT integration due to uncertainty about the use of interactive technologies and methods to promote teaching and learning (DeCoito & Richardson, 2018). When planning for inclusion of innovative practices in teaching and learning, it is important for education managers to consider where teachers are to accurately gauge the strengths, weaknesses, and areas for improvement thus creating a well-directed plan.

*Managing the Future.* To manage the future means to articulate a clear vision of what can be accomplished. Supervisors should constantly restate and reinforce his/her vision of the future to members of the area school improvement planning. To design an effective school improvement plan, one must start with a vision, conduct a needs assessment and identify goals and objectives (Pipkin, 2015). This would help others visualize a new kind of future that includes possibilities as well as probabilities (Turkoglu & Cansoy, 2018).

Leaders also need to make sure that the vision is clearly communicated to every employee for them to have a map to get to the organization's destination and this facilitates stakeholder engagement (Naaranoja & Savolainen, 2016). Principals must also define objectives with teachers to inspire commitment in their job (Ogundele et al., 2015). When school plans in terms of innovations in instructional practices are done collaboratively it advocates a shared leadership (Thompson, 2017) and this empowers teachers to be a part of a shared decision-making process (Miles, 2018).

*Managing Continuous Improvement.* Continuous improvement can refer to a school culture that constantly focuses on the conditions, processes, and practices that will improve teaching and learning (Elgart, 2017). Managers should lead the school's ongoing commitment to quality improvement efforts through evidence-based, integrated, contextualized, and iterative strategies (Best & Dunlap, 2014). Hence, to respond to issues in technology integration, managers may involve teachers in action research where they go through a cyclical approach to problem solving by allowing them to reflect on their work, recognize problem areas, try probable solutions to those problems, observe and evaluate interventions, and adapt interventions based on data collected.

Furthermore, Kuo, Nai-Cheng (2015) emphasized on the importance of engaging teachers in critically reflective activities about their educational practice as this leads to better aligned programs in relation to technology integration. Elgart (2017) further added that well-coordinated programs and training opportunities lead to strong relationships between effective continuous improvement practices and high performance. Hence, the education manager's role in this context is to give teachers timely feedback. The significant influence of feedback on teachers' instructional competence implies that the more teachers are mentored, the better teachers they would become (Bello & Olaer, 2020).

*Manage Teaching Principles.* This refers to the task of managers that ensures teaching is effectively and efficiently done. One way of ensuring this is through the conduct of supervision. Adequacy of supervision together with effective teaching, mastery of the subject, instructional tools, and classroom management produces better instructional performance (Lopez, 2016). A good supervisory practice seeks to evaluate its personnel, procedures and results that promotes learner's growth and, hence, eventually the improvement of the society (Khun-inkeeree, 2019).

In addition, Eshetu (2020) pointed out that the quality of the school is dependent upon the quality of classroom instruction and the quality of instruction is dependent upon the quality of the faculty. The quality of the faculty depends upon the quality of the supervision, which faculty members receive (Cudney & Ezzell, 2017). When teachers are guided especially in the challenge of a 21<sup>st</sup> century classroom that requires learner centered teaching methods, this develops leadership within the group, improves the skills of teachers and helps teachers improve their ability to assess work results (Rahabav, 2016).

*Manage Teaching Methods.* Supervisors need to guide teachers in designing lessons and in using suitable teaching methods with technology integration. Instructional supervision is very important as administrators can reinforce and enhance teaching practices that will contribute to improved student learning. With the challenges imposed of the 21<sup>st</sup> century, the classroom teachers are expected to use learner centered teaching methods using technology tools (Cudney & Ezzell, 2017). To supervise and evaluate teachers' use of technology, it is essential for principals in the 21<sup>st</sup> century to become familiar with technology standards. Teachers in schools where instructional supervision was adequate were more effective than those that had inadequate instructional supervision (Iroegbu & Etudor-Eyo, 2016).

However, Brinkmann (2019) argues that pedagogical reforms should focus less on a predesigned model of learner-centered practice and more on its underlying beliefs: by seeking to instill culturally relevant learning-centered beliefs and involving teachers themselves in determining what learning-centered practice might look like within their context. To affect teacher quality positively, instructional leaders must engage teachers in ways that support improved practice and seek to empower teachers as creative and knowledgeable risk-takers. There is a need to change the strategy in supervision to a more collaborative, strengths-based approach that promotes teacher growth, rather than one that conditions teachers to await administrator directive or approval (Stark, McGhee & Jimerson, 2017).

### **Technological Pedagogical Content Knowledge (TPACK)**

TPACK is a technology integration framework that identifies three types of knowledge teachers need to combine for successful educational technology integration—technological, pedagogical, and content knowledge. This framework was introduced by Punya Mishra and Matthew J. Koehler of Michigan State University in 2006 (Kaya-Uyanik, Gur-Erdogan, & Canan-Gungoren, 2019). It was previously known as TPCK framework, but it was renamed TPACK to be easily remembered as a more integrated whole for the three kinds of knowledge tackled: technology, pedagogy, and content. Also, this framework arose from the conception that technology integration in a specific educational context gained from a careful alignment of content, pedagogy, and the potential of technology. Therefore, teachers who want to incorporate technology in their teaching practice need to be proficient in all three domains (Voogt et al., 2012).

Akman and Guven (2015) discussed that the TPACK consists of three domains: technology knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK). Four other domains emerged from the intersection of aforementioned three knowledge domains. These domains are named as Technological Pedagogical Knowledge (TPK), Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), and Technological Pedagogical Content Knowledge or TPCK (Arslan, 2020). Teacher needs to possess content knowledge, pedagogical knowledge, and pedagogical content knowledge to create the best possible learning environment (Lee Shulman, as cited by Andzenge, 2018).

**Technology Knowledge (TK).** Technology in education is the efficient usage of software tools like operating systems, computer hardware, word processors, spreadsheet programs, web browser and email in addition to books, chalk, and blackboard (Absari, Priyanto, & Muslikhin, 2020). The current trends of 21<sup>st</sup> century education highlighted technology infusion, and this has transformed the teaching and learning process. Hence, education systems in the Philippines and abroad need to support teacher advancement in

terms of technology knowledge to meet current demands in the academe. However, TPACK of teachers are still constrained on components related to technology (Masrifah et al., 2018).

Moreover, Taimalu and Luik (2019) emphasized that the teacher's advancement in technology knowledge is thwarted by recurring issue related to teachers' beliefs about the value of technology, low level of computer literacy, absence of technology integration in the curriculum (Adnan et al., 2019), and the lack of available and accessible technological resources (Nueva, 2019). Since the advancement of technologies keeps on altering the teaching practices and the learning process in general, other educational institutions from different countries around the world have also started to embrace these changes (Alda, Boholano & Dayagbil, 2020).

De Freitas (2018) further suggests that, education managers should design professional development programs that are: teacher-owned, related to teachers' daily practice, strengthen the professional community of teachers, align programs with 21st-century learning goals, build on teachers' existing pedagogical content knowledge while moving toward enhancing their TPACK, and address issues of leadership.

*Content Knowledge (CK).* Subject knowledge is an essential component of teacher knowledge. Teachers' knowledge of the subject is important because of its implication to a student's achievement (Rangan, 2018) and this is considered a characteristic of exemplary teaching (Wheeldon, 2017). Considering the importance of teachers' content knowledge, in the case of science teachers, there are movements in the US requiring preservice teachers to develop robust science knowledge and skills beyond the depth and breadth needed for teaching a curriculum based on the National Science Education Standards at the grade levels they are preparing to teach. Similarly, Singapore's education system requires initial teacher preparation programmes to ensure trainees study extensively both the subject and the teaching of the subject (Goodwin, 2012).

Additionally, Depew (2015) purports that effective teaching requires teachers to possess detailed subject matter knowledge, unfortunately, most teachers lack adequate subject matter knowledge (SMK). To advance teachers' subject matter knowledge, education managers may provide development programmes that are woven into the professional lives of teachers throughout the academic year. Principals may also enhance teachers' content knowledge by working relentlessly to improve achievement by focusing on the quality of instruction. They help define and promote high expectations; they attack teacher isolation and fragmented effort; and they connect directly with teachers and the classroom and encourage continual professional learning (McLaughlin & MacFadden, 2014).

*Pedagogical Knowledge (PK).* Pedagogical knowledge is about how a subject-matter content is taught, the methods and skills in classroom management, lesson planning, student assessment and strategies applied in the classrooms, educational purposes, values, and aims (Cekerol & Ozen, 2019). Pedagogically, teachers should assess how the material applies logically through the curriculum and determine what teaching methods will be better suited to communicate the material to their students (Putri & Sari, 2021). In an environment that is rapidly changing, the process of integrating the appropriate pedagogy is a moving target and requires constant learning on everyone's part. Thus, there is a need for an enhanced school management that provide opportunities for collegial interaction, and the use of the instructional resources.

Furthermore, Paniagua and Istance (2018) surmise that, the teacher's efficacy belief is dependent on the school management and culture. Therefore, if the school has always implanted the culture to change and teachers are always sent for training for upgrading themselves, and then the integration of ICT in classroom will be easier to be enhanced in the classroom. The school manager's crucial role in the success of the school reform is also dependent on their coaching of the teachers. Principals who spend time talking with teachers about how they make decisions about the technologies they use in their instruction are likely to

learn more about the technologies and about their teachers' pedagogical insights.

*Pedagogical Content Knowledge (PCK)*. Pedagogical content knowledge (PCK) refers to the knowledge about how a particular content should be taught or the fusion of content and pedagogy that is specific to the teacher's discipline (Alzahrani, 2014). A teacher that teaches with his/her PCK takes place when they have surpassed understanding the content subject and is aware of their students' typical errors in a particular topic. Most importantly, PCK, also known as content-specific pedagogical knowledge, is integral to effective teaching and the lack of which is related to the ineffective use of subject-specific strategies thus it has an impact on student learning.

In addition, Pompea, Constance, and Walke (2017), posit that the educators can have pedagogical content knowledge competency through appropriate training and experience. Furthermore, PCK can be used as an important component for understanding and assessing teacher quality (Pei-Fen Sung & Meng-Li Yang, 2013) and to improve the learning process as it has a significant association with student learning (Olfos, Goldrine, & Estrella, 2014). In a study conducted by, McKlin, Lee., Wanzer, Magerko, Edwards, Grossman, Bryans, and Freeman (2019), they surmise that PCK plays an important role in the development of student content knowledge, and that it therefore demands further consideration in the design of teacher professional development.

*Technological Content knowledge (TCK)*. Technological content knowledge refers to the knowledge of how technology can create new representations for specific content. Akman and Guven (2015) described TCK as the knowledge about the integration of technology with content. TCK is a knowledge type that is focused on knowing the conformity of the new technology to the teaching at the same time. The teacher must know to select the appropriate technology for enriching the content of the course because a technology which does not conform to its purpose is ineffective in reintegrating the terminal behavior (Kurt, 2018).

Furthermore, Maor and Roberts (2011) observed that technology integration has not achieved desired levels throughout all grades and content areas. Teachers have been using available technologies that tend to have least impact on student engagement and most of them used technology for assessments and exercises rather than in interactive or collaborative ways (DeCoito & Richardson, 2018; Edwards, 2016). School management can play a great role in resolving these challenges through professional development and opportunities for collaboration with colleagues. Provision needs to be at hand for teachers to integrate technologies early in their practice rather than later. Aldunate and Nussbaum (as cited by DeCoito & Richardson, 2018) found that teachers who incorporated technologies early were highly possible to continue with more complicated systems rather than abandoning them altogether.

*Technological Pedagogical Knowledge (TPK)*. TPK is the knowledge of how various technologies can be used in teaching. This means the teacher knows which technological tools to use for specific classroom tasks as well as how technological tools change the nature of teaching and the learning environment (Depew, 2015). Teachers with high TPK can develop digitally literate students (Vidosavljevic & Vidosavljevic, 2019). However, teachers are challenged in terms of decision-making and choice as to which technologies to integrate into their lessons due to the abundance of technology tools. Teachers also expressed difficulty in terms of setting-up some forms of technology.

In response to this concern, Ghavifekr, Rosdy (2015) suggested to address three interlocking frameworks for change: the teacher, the school, and the policymakers. Mavhunga and Rollnick (2016) asserts that teachers need to have a clear basis for injecting technology into the classroom to make teaching better and effective. This means that school management must provide further trainings to develop teachers' pedagogical expertise to enable them to judge the potentials of technologies for varying teaching situations (Lachner, Backfisch & Stürmer, 2019) and for teachers to learn to rationalize how ICT can support the specific



teaching strategies (Heitink, Voogt, Fisser, Verplanken, & van Braak, 2017).

Technological Pedagogical Content Knowledge (TPACK). Technological Pedagogical content knowledge refers to the knowledge required by teachers for integrating technology into their teaching in any content area. In this context, teachers have an innate knowledge of the complex interaction between the three basic components of knowledge (CK, PK, TK) by teaching content using appropriate pedagogical methods and technologies (Cekerol & Ozen, 2020). A school with teachers who have high TPACK may significantly influence student achievement (Farrell & Hamed, 2017). Which means teachers who know how to make use of technology to effectively deliver their content influences student learning.

However, there are problems with technology integration. Studies show that technology integration are affected by external barriers such as access to resources, training, and support (Johnson, Jacovina, Russell, & Soto, 2016), internal barriers such as beliefs, self-efficacy, attitudes and acceptance ( Abdulaziz, 2014; Suana, 2018; Muhaimin, 2019). Given this array of issues, it is very important for school managers to establish mentorship relationships and collaboration between technical support staff and teachers in order to solve various technological issues.

This study used a linear regression analysis to measure the relationship between management skills and the technological pedagogical knowledge of private junior high schools. Regression models describe the distribution of a response conditional on a set of covariates. Such models are a versatile tool to understand how changes in the covariates propagate to changes in the distribution of the response (Klein, Hothorn, Barbanti & Kneib, 2019).

## Synthesis

In view of the existing literature presented, most of the published research related to the current study provided important discussions on the importance of management skills to the advancement of the technological pedagogical content knowledge (TPACK) of teachers. It has been observed in the literature that teachers can better enrich their classroom practices when they utilize appropriate technology and are guided by educational managers that are efficient planners, and have effective management skills. However, little research attempted to focus on how specific management skills of educational managers influence or even predict the technological pedagogical content knowledge (TPACK) of teachers. Even though there is a research trend of this in education, this body of research is still relatively small. To add to this existing body of literature, the researcher is generally interested in investigating how certain management skills of educational managers, especially principals, influence and predict the technological pedagogical content knowledge of teachers in junior high schools in Davao City. The results of this study may further strengthen the management skills of educational managers towards the enhanced implementation, adoption, and integration of technology to deliver high quality learning experience to students.

## Theoretical /Conceptual Framework

This study is anchored on the Path Goal Theory (1974) by Robert House. This theory helped to understand the role of school leaders in developing the competencies and the capabilities of subordinates by creating a continuous learning process through sharing, exchanging, and improving knowledge and experiences (Olowoselu, bin Mohamad & Aboudahr, 2019). The path goal theory consisted of four styles of leadership (directive, participative, supportive, and achievement-oriented leadership). Plausibly, educational manager's management skills have a big impact on teacher's performance, in particular on pedagogy and technology use (Farhan, 2017).

Along with the Path Goal Theory, the assumed influence of the independent variable to the dependent



variable is also supported by the Technology Acceptance Model (TAM) which was developed by Fred Davis in 1989. The TAM model explains why teachers succumb to leadership mandates especially in relation to technology integration in the school setting. TAM is an adaptation of theory of reasoned action meant to explain factors that influence users' acceptance of information technology. Also, TAM posits that two distinct constructs, perceived usefulness, and perceived ease of use, directly affect the attitude towards target system use and indirectly affect actual system use (Joo, Park & Lim, 2018).

Leaders are described as directive when they provide task directions and instructions to their followers that incorporate what their expectations are, how to follow them, and when to complete them (Northouse, 2019). Subordinates are said to be motivated for learning when leaders act as facilitators and adopt the right attitude by removing obstacles and creating a learning culture (Farhan, 2017). Hence, Principals must have friendly and approachable relationships with teachers while outlining rules to follow. On the other hand, teachers are empowered in a participative leadership because they are involved in a shared decision-making and are consulted such that their ideas and suggestions are incorporated into policymaking (Visone, 2018).

Moreover, teachers' use of technology can be very well explained using the two primary factors influencing an individual's intention to use new technology: perceived ease of use and perceived usefulness. For example, an older adult who perceives digital games as too difficult to play or a waste of time will be unlikely to want to adopt this technology, while an older adult who perceives digital games as providing needed mental stimulation and as easy to learn will be more likely to want to learn how to use digital games (Charness & Boot, 2016). Similarly, teachers could have a positive or negative mindset over technology integration if they encountered difficulties and did not find this useful in their curriculum implementation. Thus, TAM highlights the impact of principal leadership towards teachers' beliefs, attitudes, and intentions in the adoption of ICT in teaching and learning.

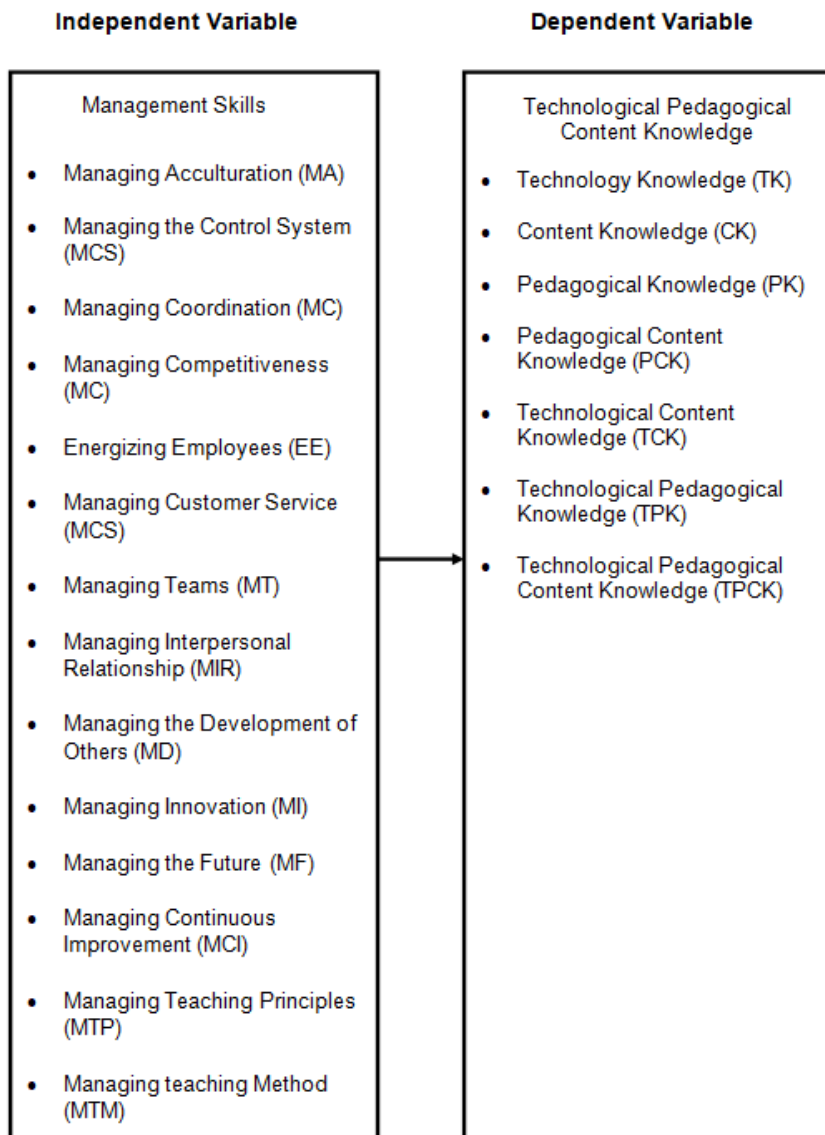
Through utilization of the TAM (Technology Acceptance Model) as a supporting theory to the main theory, it provided a better understanding on the impact of management skills of education managers to the teacher's advancement in technological pedagogical content knowledge. The two theories further explain that aside from the intrinsic and extrinsic factors, the characteristics of school heads as leaders and education managers may influence an individual's motive in adapting or rejecting new technology (Lawrence, 2018).

In connection to the theoretical framework, Figure 1 presents the conceptual framework of the current study. It can be observed how the independent and dependent variables interplay.

The independent variable is management skills which has the following observed variables: managing acculturation, managing the control system, managing coordination, managing competitiveness, energizing employees, managing customer service, managing teams, managing interpersonal relationships, managing the development of others, managing innovation, managing the future, managing continuous improvement, managing teaching principles and managing teaching methods.

The dependent variable, technological, pedagogical content knowledge (TPACK), has seven observed indicators, namely: technology knowledge, pedagogical knowledge, content knowledge, technological pedagogical knowledge, pedagogical content knowledge, technological content knowledge and technological pedagogical and content knowledge.

In this study, the management skills of educational managers serve as the independent variable while the technological pedagogical content knowledge (TPACK) of teachers act as a dependent variable. It is theorized that the management skills of educational managers can influence or predict the technological pedagogical content knowledge (TPACK) of teachers in private junior high schools in Davao City.



**Figure 1. Conceptual Framework of the Study**

## METHOD

This section presents the research method and procedure employed in this study, which includes the research design, research environment, research respondents, research instrument, data gathering procedure, and data analysis as well as other sources of information and data treatment.

### Research Design

This study specifically utilized a quantitative prediction research design using a survey method. The purpose of a prediction research design is to identify variables that will predict an outcome or criterion (Creswell, 2015). In this form of research, the investigator identifies one or more predictor variables and a criterion (or outcome) variable. A predictor variable is a variable used to make a forecast about an outcome in correlational research. It is well suited to predictive studies to explore aspects of a situation or to seek explanations and provide data for testing hypotheses. Thus, this type of research design was employed in the study.

A correlational approach was also applied in the study to measure the degree of relationship between two or

more variables (Creswell & Creswell, 2018).

The association can be evaluated by the degree of association one variable affects the other (Salkind, 2017). First, the goal was to measure the correlation between the two variables involved. These are the management skills of educational managers and the technological pedagogical content knowledge of teachers in private junior high schools in Davao City.

### **Research Locale**

The research was conducted within Davao City, particularly among private junior high schools that are Educational Service Contracting (ESC) participating schools in the division of Davao City. The ESC schools are private junior high schools which participated in a partnership program with the Department of Education (DepEd) aimed at decongesting overcrowded public

The Department of Education, described the Division of Davao City as a premier division run by professional, efficient, empowered and honest human resources, enjoying the sincere involvement and respect of the stakeholders, upholding functional education and producing morally upright, academically competent, productive and globally competitive learners.

The Division of Davao City protects and promotes the right of every Filipino to quality, equitable, cultured-based, and complete basic education where students learn in a child-friendly, gender sensitive, safe, and motivating environment. Competent teachers manage the division of city schools, and responsible teachers facilitate learning and constantly nurture every learner. The Schools Division Superintendent (ASDS) leads the 205 recognized secondary private school's division of Davao City.

### **Research Respondents**

The respondents of this study are the teachers from the private Junior High Schools in Davao City with at least one year of experience in teaching. The researcher used a two-step process to obtain the total number of respondents in this study. In obtaining the total number of schools, the researcher employed convenience-sampling techniques. Convenience sampling is applied when participating schools are selected in an ad hoc fashion based on their accessibility to the researcher (Jager, Putnick & Bornstein, 2017). The researcher first obtained the list of private schools from the PEAC website and emailed the school heads of the fifty schools. However, there is only a 50 percent response rate; hence, the researcher has chosen the 25 participating schools as samples because they are willingly available to participate in the study.

The 205 teacher-respondents were obtained by means of universal sampling. Universal sampling is a sampling method wherein during the selection of samples not all the people in the population have the same probability of being included in the sample and each one of them, the probability of being selected is unknown (Ramoso & Cruz, 2019). As the school heads received the electronic mail with the link to the online survey, these were forwarded to their teachers who have served at least one year without any other characteristics. The sample size of 205 is acceptable in a correlation study, since a sample size needed to detect the higher correlation coefficient is only a sample size of minimum 29 to be able to detect correlation coefficient of 0.5 (Bujang & Baharum, 2016).

### **Research Instruments**

The research instruments used in gathering the data were adapted from various authors, modified to fit with the current study. The two instruments are as follows: Management Skills Assessment Instrument (Cameron & Quinn, 1999) and the TPACK (Koh, Chai, & Tsai, 2014). For safety and security reasons of this pandemic, the adapted questionnaires were converted into online survey form. These instruments were subjected to validation by four validators who are experts on the field of research (Appendix E). These were

also pilot tested to 30 teachers from Assumption College of Davao to test its reliability. Reliability was established applying Cronbach’s alpha based on standardized items. The results were all within the acceptable range, which are greater than 0.70 (Appendix F).

The research instrument for managerial skills adopted from Cameron and Quinn (1999) was designed to assess and help managers and leaders identify the necessary skills and competencies that they must either develop or improve. The competencies included in this instrument are all associated with high managerial and organizational performance. The MSAI questionnaire had 14 indicators and each indicator consisted of 5 items, hence, a total of 70 questions about the management skills of educational managers. The indicators of this questionnaire are: managing acculturation, managing control system, managing coordination, managing competitiveness, energizing employees, managing customer service, managing teams, managing interpersonal relationships, managing development of others, managing innovation, managing the future, managing continuous improvement, managing teaching principles and managing teaching methods.

A five (5) point Likert Scale with anchors always, almost always, sometimes, seldom and never is used to answer the questionnaire.

<i>Mean Interval</i>	<i>Description</i>	<i>Interpretation</i>
4.20-5.00	Very High	The managerial skill is always evident among educational managers.
3.40-4.19	High	The managerial skill is almost always evident among educational managers.
2.60-3.39	Moderate	The managerial skill is sometimes evident among educational managers.
1.80-2.59	Low	The managerial skill is seldom evident among educational managers.
1.00-1.79	Very Low	The managerial skill is never evident among educational managers.

The TPACK survey questionnaire of Koh, Chai, and Tsai (2014) intends to determine the teachers’ TPACK constructs. This 40-item questionnaire was modified to measure each of the seven components of TPACK. The 7 indicators of TPACK are: content knowledge (CK), technological knowledge (TK), pedagogical knowledge (PK), technological pedagogical knowledge (TPCK), pedagogical content knowledge (PCK), technological content knowledge (TCK) and technological pedagogical and content knowledge (TPCK).

The respondents will respond to every item in the 5-point Likert scale ranging from “Almost Never” to “Always”. The following parameter limits were used.

<i>Mean Interval</i>	<i>Description</i>	<i>Interpretation</i>
4.20-5.00	Very High	The TPACK skill is always evident among teachers.
3.40-4.19	High	The TPACK skill is almost always evident among teachers.
2.60-3.39	Moderate	The TPACK skill is sometimes evident among teachers
1.80-2.59	Low	The TPACK skill is seldom evident among teachers.
1.00-1.79	Very Low	The TPACK skill is never evident among teachers.

### **Ethical Considerations**

This section contains the ethical considerations that the researcher will employ to ensure adherence to the universal principles for the protection of human participants in research. This is in compliance with the mandate under Republic Act No. 10532, otherwise known as the Philippine National Health Research System Act of 2013, of which Section 12 states that the Philippine Health Research Ethics Board (PHREB), created under DOST Special Order No. 091 s. 2006 (PHREB,2017).

*Social Value.* The current educational scenario calls for responding to the challenge of school innovation

with the help of school administrators. This study would contribute to the spreading of evidence-based knowledge, research, and findings to other educational institutions and to the public about the important role of education managers on the advancement of school in technology and pedagogy (see page 6-7).

*Informed Consent/ Assent.* An online survey created in a Google form was used to collect the data for this study after the participants completed the first part of the informed consent form. To start the data gathering process, the researcher sent a letter to the school Principal through email to seek permission to conduct the study. The letter further expressed the request for the Principals to randomly choose eight teachers to answer the online survey form. The teachers who are willing to take-part in study were asked to answer the survey with the informed consent. To ensure that the recruited respondents have adequate information concerning the study, a soft copy of the downloadable informed consent is accessible to all participants by simply clicking the link provided in the online survey form.

After obtaining the consent form, the researcher ensured that there is an open communication line with the respondents by providing them with the contact numbers and email address for inquiries about the informed consent, the questions in the online survey form as well as the procedure in accomplishing the survey form. The participants are provided with the link to the downloadable digital copy of the informed consent for their perusal.

To ensure that the respondents have the option and not coerced to participate in the study, Section I of the online survey form asks them to confirm their participation in the study. If the respondents opted to take part in the study, they can proceed to the next section of the online survey form that contains the three questionnaires. However, if they opted to desist from joining the study, they are asked to submit the form and will no longer be contacted.

*Risks, Benefits, and Safety.* The researcher informed the respondents explicitly that if they find discomfort in answering some questions, they are free not to answer them. Furthermore, the researcher will make it clear to the respondents that participation in the research does not affect their work status or the outcome of their performance evaluations.

In terms of benefits in participating in the study, the researcher provided the respondents with clear information about possible benefits associated with participating in the research. In addition, the researcher shall strive to ensure the reasonable availability and accessibility of favorable research outcomes to the community.

*Privacy and Confidentiality of Information.* After the researcher has conducted data collection using an online survey form, the researcher ensured the confidentiality of the information supplied by the research subjects and the anonymity of respondents. Respondents were assigned a random numerical code to ensure confidentiality of their responses to the online survey form. The respondents were informed that upon completion of the research, the research findings might be shared more broadly through publications and conferences. However, the researcher will ensure that during the sharing of research findings, records that link individuals to specific information shall not be released to prevent exposure of respondents to possible harm or social stigma.

All digital copies containing the information of the participants were saved in computers secured with password. After all target respondents have answered the online survey, the researcher created a worksheet (Excel file) of the summary of responses gathered. These files were kept in the researcher's cloud storage (Google Drive) and in a secure folder in the researcher's personal computer. The downloaded file was provided with an encryption code to ensure restricted access and inaccessibility to unauthorized persons. The Statistician was given access to the encrypted summary of the data to proceed with data analysis.



In terms of disposal, all data will be stored for 5 years after which, the printed documents will be shredded, and the digital copies will be deleted. The files containing the individual responses to the online survey form and the summary of responses in a worksheet form, which were saved in the researcher's cloud storage (Google Drive), and personal computer will be deleted after these have been fully utilized in the study.

*Justice.* In the selection of the respondents of the study, the researcher employed a scientific process of sampling method to ensure that each member of the population has an equal chance of being selected as a subject. The researcher through the gatekeepers like the school head used a universal sampling method in selecting the eight respondents from their respective schools. Due to time constraints, the researcher has given the school head the liberty to do the recruitment process of the eight (8)-teacher respondents per school.

The respondents were provided with a pack of goodies and one piece of school supply as compensation for their time and contribution in answering the questionnaires.

*Transparency.* The researcher provided comprehensive curriculum vitae to disclose information about her, her school and the current position she holds to ensure objectivity and integrity of the research output. Furthermore, the researcher ensured that the research findings are scientifically valid and confirmed and have significant implications for the participant's well-being. The researcher offers copies of the completed study to the research respondents or provides them with the links to the website where the study is published to ensure that respondents are informed of the outcomes and to check whether confidential information about them is made available to others.

*Qualification of Researcher.* The researcher has been in the teaching profession for 20 years and is currently in her 2<sup>nd</sup> year as department head of a private school offering a basic education curriculum. In all these experiences, she is constantly engaged with the faculty, supervisors and administrators of the school. Furthermore, in her two decades of service in the private school she has gained insights on the different issues confronting the management and is unceasingly finding possible solutions to these. The researcher is involved in the school's research committee, has attended several workshops related to leadership and management, and has conducted training in teaching methods integrating technology in the classroom.

*Adequacy of Facilities.* The researcher followed protocols in the conduct of the study. As a form of courtesy, the researcher approached gatekeepers such as the Principal, Research Head and other key personnel involved before directly approaching participants.

*Community Involvement.* The researcher entered into a dialogue with the administrators, the teachers, and other concerned offices. This is to ensure that the context of the research locale may not come into conflict with the research requirements regarding quality and impartiality. The researcher also refrained or avoided using classifications or designations that allow unreasonable generalization.

*Participation and Withdrawal.* The participants were informed in writing of the voluntary nature of their participation and that they could withdraw from the study at any time without having to give any reason, and without penalty or loss of benefits to which he or she is entitled and or any legal implication. They were also advised that anytime during the process they could decline to answer any question.

## **Data Gathering Procedure**

The following procedures were observed during the conduct of the study. The researcher sought approval from the Dean of the Graduate School of Holy Cross of Davao College to start the data gathering processes. After which, the researcher wrote a letter to the heads of private junior high schools of Davao City for

permission to conduct the study. The letter which contains the online survey form and the link to the downloadable copy of the letter of informed consent was provided to the randomly selected teacher respondents of the study. The researcher also asked the assistance of the staff or trusted supervisors in some cases.

The researcher monitored the respondent's accomplishment of the online survey and the turnout of responses on a weekly basis. After the retrieval of the answers in the online survey, the researcher organized the data collected by creating a file. The data were collated, tabulated, subjected to statistical treatment, analysis and interpretation for the purposes of the study.

### Data Analysis

To statistically measure, describe, analyze, and interpret the data, the following statistical tools were applied:

*Mean.* The mean, also referred to as the average, is the most common statistic used to measure the center of a numerical data set. It is used in this study to measure the level of management skills and technological pedagogical advancement of teachers.

*Standard deviation.* It refers to the actual root-mean-squared deviation of a population or a sample of data around its mean. This was employed to measure the amount of variability or dispersion around an average.

*Pearson Product Moment Correlation Coefficient.* It is used to measure the relationship between two quantitative variables and the degree to which the two variables coincide with one another, the extent to which two variables are linearly related (Allen, 2017). This was employed to determine the relationships between management skills of educational managers and the technological pedagogical knowledge of private schools. In this study, the values of  $r$  ranges from -1 to +1 are interpreted using the Rule of Thumb for Interpreting the Size of a Correlation Coefficient of Hinkle et al. (2003).

Pearson r- values	Interpretation
0.90 – 1.00 (-0.90 to -1.00)	Very Strong or Very High Correlation
0.70 – 0.90 (-0.70 to -0.90)	Strong or High Correlation
0.50 – 0.70 (- 0.50 to -0.70)	Moderate Correlation
0.30 – 0.50 (- 0.30 to -0.50)	Weak or Low Correlation
0.00 – 0.30 (0.00 to -0.30)	Very Weak or Very Little Correlation

*Regression.* Regression analysis is a set of statistical methods used for the estimation of relationships between a dependent variable and one or more independent variables (Plonsky & Ghanbar, 2018). For this study, this was used to determine the variables, which are the best predictors that influence teachers' technological pedagogical knowledge. Also, it investigates and models the relationship between variables involved in the study. Regression models describe the distribution of a response conditional on a set of covariates (Klein, Hothorn, Barbanti & Kneib, 2019).

All statistical analyses were conducted using Statistical Software for Social Sciences (SPSS) version 25. IBM® SPSS® Statistics is the world's leading statistical software used to solve business and research problems by means of ad-hoc analysis, hypothesis testing, and predictive analytics.

## RESULTS AND DISCUSSIONS

Presented in this chapter are the discussions of the results and the analyses of data. The analyses of the gathered data were done to answer the research questions as stated in Chapter 1 of this research study. Data

on the levels of educational managers' management skills and teachers' technological pedagogical content knowledge are presented and described. In addition, the data to determine significant relationships as well as the size of influences of the predictor variable and its indicators were also analyzed, interpreted, and discussed.

### Level of Management Skills of Educational Managers

The first research question of the study examined the level of management skills of educational managers with 14 specific indicators. Table 1 provides the answer to this research question. The overall mean rating of 4.36 from the 205 respondents is described as very high which explains that management skills are always evident among educational managers.

Among the 14 indicators in the management skills of education managers, respondents perceived that managing *teaching methods* has the highest mean score of 4.55 or very high, which means that it was almost all the time practiced and observed. This signifies that education managers always ensure that teachers design suitable teaching methods based on the lesson, use a variety of teaching methods based on the objectives, use instructional technology in the classroom, familiar with the updated school curriculum and involved in the curriculum improvement process.

The result is in line with the Path Goal Theory of House (1974) that emphasizes the role of learning leaders as facilitators of the organizational learning process and adopts the right attitude to motivate subordinates for learning by removing obstacles and creating a learning culture. Education managers need to develop their competencies and the capabilities of subordinates by creating a continuous learning process through sharing, exchanging, and improving knowledge and experiences.

**Table 1. Level of Management Skills of Educational Managers**

Management Skills of Educational Managers	Mean	Description
I. Managing Acculturation		
In our school, the Principal...		
1. Ensures that all teachers clearly understand the school policies, values, and objectives.	4.49	Very High
2. Ensures that teachers have a clear picture of how their job fits with others in the school.	4.4	Very High
3. Provides experience for teachers that help them become socialized and integrated into the culture of the school.	4.41	Very High
4. Clarifies for members what exactly is expected of them.	4.42	Very High
5. Establishes ceremonies and rewards that reinforce the values and culture of the school.	4.28	Very High
Overall	4.4	Very High
II. Managing the Control System		
In our school, the Principal...		
6. Keeps close track of how the department is performing.	4.39	Very High
7. Assures that regular reports and assessments occur in the department.	4.4	Very High
8. Fosters rational, systematic decision analysis to reduce the complexity of important issues.	4.26	Very High
9. Establishes a control system that assures consistency in quality, service, cost and productivity in the area.	4.32	Very High

10. Uses a measurement system that consistently monitors both work processes and outcomes.	4.27	Very High
Overall	4.33	Very High
<b>III. Managing Coordination</b>		
In our school, the Principal...		
11. Interprets and simplifies complex information so that it is clearly understood and can be shared throughout the school.	4.38	Very High
12. Coordinates regularly with managers in other units of the school.	4.39	Very High
13. Shares information regularly in the different units of the school to facilitate coordination.	4.31	Very High
14. Maintains a formal system for gathering and feed backing with other units.	4.33	Very High
15. Initiate cross-functional teams that focus on important school issues.	4.31	Very High
Overall	4.34	Very High
<b>IV. Managing Competitiveness</b>		
In our school, the Principal...		
16. Fosters a sense of competitiveness that encourages better teacher performance.	4.31	Very High
17. Drives teachers to achieve higher levels of teaching performance.	4.45	Very High
18. Encourages teachers to use innovative teaching strategies that hooks students by exceeding their expectations.	4.5	Very High
19. Monitors teacher performance and provides constructive feedback regularly.	4.34	Very High
20. Creates a school climate where teachers achieve higher levels of performance than the competition.	4.37	Very High
Overall	4.39	Very High
<b>V. Energizing Employees</b>		
In our school, the Principal...		
21. Motivates and energizes others to do a better job.	4.28	Very High
22. Insists on intense hard work and high productivity from teachers.	4.19	High
23. Establishes ambitious goals that challenge subordinates to achieve performance levels above the standard.	4.19	High
24. Empowers teachers in the area, by fostering a motivational climate that energizes everyone involved.	4.25	Very High
25. Facilitates a climate of aggressiveness and intensity in the area.	3.96	Very High
Overall	4.17	High
<b>VI. Managing Customer Service</b>		
In our school, the Principal...		
26. Consistently and frequently contacts students.	4.06	High
27. Ensures to assess how well the teachers are meeting students' /parents' expectations.	4.38	Very High
28. Assures that everything the school does is focused on better serving our students/parents.	4.47	Very High
29. Ensures that the teachers continually gather information on students' needs and preferences.	4.47	Very High
30. Involves students/parents in the school planning and evaluations.	4.33	Very High

Overall	4.34	Very High
VII. Managing Teams		
In our school, the Principal...		
31. Builds cohesive, committed teams of people.	4.3	Very High
32. Facilitates effective information sharing and problem-solving in the department.	4.35	Very High
33. Creates an environment where involvement and participation in decisions are encouraged and rewarded.	4.33	Very High
34. Ensures that sufficient attention is given to both task accomplishment and to interpersonal relationships.	4.32	Very High
35. Ensures collaboration and positive conflict resolution among subject area teachers.	4.4	Very High
Overall	4.34	Very High
VIII. Managing Interpersonal Relationships		
In our school, the Principal...		
36. Communicates in a supportive way when teachers share their problems with him/her.	4.28	Very High
37. Gives teachers regular feedback about how they're doing.	4.2	Very High
38. Fosters teacher's self-improvement rather than defensiveness or anger when giving negative feedback.	4.27	Very High
39. Listens openly and attentively to others who give their ideas, even when he/she disagrees.	4.31	Very High
40. Fosters trust and openness to the point of view of individuals who confide with him/her with problems or concerns.	4.33	Very High
Overall	4.28	Very High
4IX. Managing the Development of Others		
In our school, the Principal...		
41. Coaches teachers regularly to improve their management skills, so they can achieve higher levels of performance.	4.2	Very High
42. Make sure that teachers are provided with opportunities for personal growth and development.	4.37	Very High
43. Gives teachers assignments and responsibilities that provide opportunities for their personal growth and development.	4.38	Very High
44. Actively helps prepare teachers to move up in the school.	4.27	Very High
45. Facilitates a work environment where peers as well as subordinates learn from and help develop one another.	4.37	Very High
Overall	4.32	Very High
X. Managing Innovation		
In our school, the Principal...		
46. Encourage teachers to generate new ideas and methods.	4.43	Very High
47. Generates, or helps teachers obtain, the resources necessary to implement their innovative ideas.	4.36	Very High
48. Sponsors teachers in the department when they come up with a new idea and help them to follow through on it.	4.19	High



49. Regularly comes up with new, creative ideas regarding processes, products, or procedures.	4.26	Very High
50. Creates an environment where experimentation and creativity are rewarded and recognized.	4.24	Very High
Overall	4.31	Very High
<b>XI. Managing the Future</b>		
In our school, the Principal...		
51. Articulates a clear vision of what can be accomplished in the future.	4.41	Very High
52. Constantly restates and reinforces his/her vision of the future to members of the faculty.	4.38	Very High
53. Help others visualize a new kind of future that includes possibilities as well as probabilities.	4.35	Very High
54. Develops a clear strategy for helping the teachers successfully accomplish the schools' vision of the future.	4.39	Very High
55. Captures the imagination and emotional commitment of teachers when they talk about his/her vision of the future.	4.31	Very High
Overall	4.37	Very High
<b>XII. Managing Continuous Improvement</b>		
In our school, the Principal...		
56. Continuously improves the processes used by the school to achieve desired output.	4.41	Very High
57. Facilitates a climate of continuous improvement in the school.	4.4	Very High
58. Encourages everyone in the school to constantly improve and update everything they do.	4.42	Very High
59. Encourages all teachers to make small improvements continuously in the way they do their jobs.	4.45	Very High
60. Motivates teachers to strive for improvement in all aspects of their lives, not just in job related activities.	4.36	Very High
Overall	4.41	Very High
<b>XIII. Manage Teaching principles</b>		
In our school, the Principal...		
61. Connect instruction with the life experience of the student	4.49	Very High
62. Relate instruction to life in society	4.5	Very High
63. Apply instruction to the real-life situation of learners.	4.52	Very High
64. Prepare instruction based on the syllabus.	4.56	Very High
65. Integrate instruction in different subjects.	4.5	Very High
Overall	4.51	Very High
<b>XIV. Manage Teaching methods</b>		
In our school, the Principal...		
66. Design suitable teaching methods based on the lesson.	4.52	Very High
67. Use a variety of teaching methods based on the objectives.	4.54	Very High
68. use instructional technology in the classroom	4.54	Very High
69. Become familiar with the updated school curriculum.	4.59	Very High
70. Be involved in the curriculum improvement process.	4.58	Very High

Overall	4.55	Very High
OVERALL Level of Management Skills of Educational Managers	4.36	Very High

The indicator *managing teaching principles* got a mean score of 4.51 or very high, which means that it was always practiced and observed. This implies that education managers ensure that teachers connect instruction with the life experience of the student, relate instruction to life in society, apply instruction to the real-life situation of learners, prepare instruction based on the syllabus and integrate instruction in different subjects.

*Managing acculturation* has a mean score of 4.40 or very high, which means that it was always practiced and observed. This implies that education managers ensures that all teachers clearly understand the school policies, values, and objectives, ensures that teachers have a clear picture of how their job fits with others in the school, provides experience for teachers that help them become socialized and integrated into the culture of the school, clarifies for members what exactly is expected of them, establishes ceremonies and rewards that reinforce the values and culture of the school.

On the other hand, the indicator *managing continuous improvement* has a very high mean score which means that it was always practiced and observed. This implies that education managers continuously improves the processes used by the school to achieve desired output, facilitates a climate of continuous improvement in the school, encourages everyone in the school to constantly improve and update everything they do, encourages all teachers to make small improvements continuously in the way they do their jobs and motivates teachers to strive for improvement in all aspects of their lives, not just in job related activities.

The indicator *managing competitiveness* received a mean score of 4.39 or very high, which means that it was always practiced and observed. This implies that as education managers foster a sense of competitiveness that encourages better teacher performance, drives teachers to achieve higher levels of teaching performance, encourages teachers to use innovative teaching strategies that hooks students by exceeding their expectations, monitors teacher performance and provides constructive feedback regularly and creates a school climate where teachers achieve higher levels of performance than the competition.

*Managing the future* has a mean score of 4.36 or very high, which means that it was always practiced and observed. This implies that the Principal articulates a clear vision of what can be accomplished in the future, constantly restates and reinforces his/her vision of the future to members of the faculty, help others visualize a new kind of future that includes possibilities as well as probabilities, develops a clear strategy for helping the teachers successfully accomplish the schools' vision of the future and captures the imagination and emotional commitment of teachers when they talk about his/her vision of the future. This is supported by Ogundele, et. al. (2015) in their study that Principals must define objectives with teachers as teachers would be committed in their job to ensure that the objectives are achieved as they participated in deciding the objectives.

The indicator *managing coordination* has a mean score of 4.34 or very high, which means that it was always practiced and observed. This implies that the Principal interprets and simplifies complex information so that it is clearly understood and can be shared throughout the school, coordinates regularly with managers in other units of the school, shares information regularly in the different units of the school to facilitate coordination, maintains a formal system for gathering and feed backing with other units and initiate cross-functional teams that focus on important school issues.

The indicator *managing customer service both* have a mean score of 4.34 or very high, which means that it was always practiced and observed. This implies that the principal consistently and frequently contacts students, ensures to assess how well the teachers are meeting students'/parents' expectations, assures that everything the school does is focused on better serving our students/parents, ensures that the teachers

continually gather information on students' needs and preferences and involves students/parents in the school planning and evaluations.

The indicator *managing teams* has a mean score of 4.33 or very high, which means that it was always practiced and observed. This implies that the principals build cohesive and committed teams of people, facilitate effective information sharing and problem-solving in the department, creates an environment where involvement and participation in decisions are encouraged and rewarded, and ensures that sufficient attention is given to both task accomplishment and to interpersonal relationships and ensures collaboration and positive conflict resolution among subject area teachers.

This is supported by the varied authors, that posits team conditions can have a significant direct and indirect impact on team performance (Tabassi, Roufechaei, Bakar, Yusof (2017), teamwork can broaden the team's collective knowledge base, and consequently improve team effectiveness (Benoliel & Schechter, 2018). In addition, Gombakomba, Oyedele, Chikwature & Oyedele, (2017) assumes that the lack of teamwork leads to negative behavior and can bring challenges like delay in implementation of policies and spreading of malicious gossip. Hence, teamwork between teachers and school administrators is of paramount importance for the achievement of organizational goals as a school.

The indicator *managing control system* has a mean score of 4.32 or very high, which means that it was always practiced and observed. This implies that the school principal keeps close track of how the school is performing, assures that regular reports and assessments occur in the unit, fosters rational, systematic decision analysis to reduce the complexity of important issues, establishes a control system that assures consistency in quality, service, cost and productivity in the area and uses a measurement system that consistently monitors both work processes and outcomes.

The indicator *managing development of others* has a mean score of 4.31 or very high, which means that it was always practiced and observed. This implies that Principals coach teachers regularly to improve their management skills so they can achieve higher levels of performance, and make sure that teachers are provided with opportunities for personal growth and development, give teachers assignments and responsibilities that provide opportunities for their personal growth and development, actively helps prepare teachers to move up in the school and facilitates a work environment where peers as well as subordinates learn from and help develop one another.

The indicator *managing innovation* has a mean score of 4.29 or very high, which means that it was always practiced and observed. The result implies that Principals encourage teachers to generate new ideas and methods, generates, or help teachers obtain, the resources necessary to implement their innovative ideas, sponsors teachers in the department when they come up with a new idea and help them to follow through on it, regularly comes up with new, creative ideas regarding processes, products or procedures for the school and creates an environment where experimentation and creativity are rewarded and recognized.

The indicator *managing interpersonal relationships* received a mean score of 4.27 or very high, which means that it was always practiced and observed. This implies that Principals communicates in a supportive way when teachers share their problems with him/her, gives teachers regular feedback about how they're doing, fosters teacher's self-improvement rather than defensiveness or anger when giving negative feedback, listens openly and attentively to others who give their ideas, even when he/she disagrees and fosters trust and openness to the point of view of individuals who confides with him/her with problems or concerns.

The lowest indicator, albeit still high, is the *energizing employees*, which obtained a mean score of 4.17 which means it is almost all the time practiced and observed. This implies that the Principal motivates and energizes teachers to do a better job, insists on intense hard work and high productivity from teachers,

establishes ambitious goals that challenge subordinates to achieve performance levels above the standard, empowers teachers in the area, by fostering a motivational climate that energizes everyone involved and facilitates a climate of aggressiveness and intensity in the area.

This result confirms the idea of Kimball (2016) that teachers feel an increased self-confidence when schools are able to create a school climate which fosters a sense of achievement and when this happens their negative beliefs on technology could be reversed. Patimah (2017) concluded that external motivation teachers’ achiever motivation is positively influenced by the principal leadership style. Internal or external incentives energizes teachers and encourages them to exert more effort in their teaching performance (Macartney et al., 2018; Hui-Min Lai et al., 2018).

### Level of Technological Pedagogical Knowledge of Teachers in Private Junior High Schools in Davao City

The second objective of the study was to determine the level of technological pedagogical content knowledge of private Junior High School teachers in Davao City generated from 205 respondents.

As shown in Table 2 the overall mean rating is 4.46, which is described as very high. This means that the technological pedagogical content knowledge is always evident among teachers in private junior high schools in Davao City.

**Table 2. Level of Technological Pedagogical Content Knowledge (TPACK) of Teachers in Private Junior High School in Davao City**

Technological Pedagogical Content Knowledge of Private Junior High School Teachers	Mean	Description
<b>I. Content Knowledge (CK)</b>		
In our school, the Principal ensures that teachers...		
1. Plan the sequence of concepts taught within their class.	4.52	Very High
2. Have a mindset of a subject-matter expert about the content of their discipline.	4.55	Very High
3. Develop a deeper understanding of the content of their subject area.	4.57	Very High
4. Have sufficient knowledge of their subject area	4.59	Very High
5. Have the expertise to decide on the scope of concepts taught within their class.	4.55	Very High
6. Have ample understanding of the curriculum framework of their subject.	4.57	Very High
Overall	4.56	Very High
<b>II. Technology Knowledge</b>		
In our school, the Principal ensures that teachers...		
7. Have the technical skills to use the internet and computers effectively	4.51	Very High
8. Know how to solve their own technical problems when using technology.	4.38	Very High
9. Use collaboration tools (e.g., Google docs).	4.53	Very High
10. Use communication tools (e.g., Slack, Telegram)	4.33	Very High
11. Use annotating tools (e.g., Insert Learning, Kami.)	4.19	High
12. Use mind map /visualization tools (e.g., Infogram, Coggle, bubble.us, Visme, Mindmeister).	4.22	Very High
Overall	4.36	Very High
<b>III. Pedagogical Knowledge</b>		
In our school, the Principal ensures that teachers...		

13. Create challenging tasks to stretch students' thinking.	4.5	Very High
14. Guide students to adopt appropriate learning strategies.	4.51	Very High
15. Guide students to monitor their own learning.	4.49	Very High
16. Help students to reflect on their learning strategies.	4.52	Very High
17. Implement varied group activities for students.	4.54	Very High
18. Guide students to discuss effectively during group work.	4.52	Very High
Overall	4.51	Very High
<b>IV. Technological Pedagogical Knowledge (TPK)</b>		
In our school, the Principal ensures that teachers...		
19. Use technology to introduce real world scenarios to students.	4.5	Very High
20. Use technology to enable students to find more information on their own.	4.52	Very High
21. Help students to use technology to plan and monitor their own learning.	4.46	Very High
22. Assist students to use technology to construct different forms of knowledge representation.	4.43	Very High
23. Facilitate students to collaborate with each other using technology.	4.49	Very High
24. Help students to use web 2.0 applications in presenting what they have learned.	4.36	Very High
Overall	4.46	Very High
<b>V. Pedagogical Content Knowledge (PCK)</b>		
In our school, the Principal ensures that teachers...		
25. Address the common misconceptions students have about their subject without using technology.	4.36	Very High
26. Help students to understand the content knowledge of their subject through problem-based learning	4.47	Very High
27. Employ active learning strategies to deepen students' understanding of the subject.	4.54	Very High
28. Use cooperative learning strategies to extend students' appreciation of the subject.	4.5	Very High
29. Use a particular strategy best suited to teach a specific concept of their subject.	4.53	Very High
30. Help students to understand the content knowledge of their subject in various ways without using technology.	4.46	Very High
Overall	4.48	Very High
<b>VII. Technological Content Knowledge (TCK)</b>		
In our school, the Principal ensures that teachers...		
31. Use the software that is created specifically for their specific subject	4.3	Very High
32. Know about the technologies to use for research of the subject content	4.43	Very High
33. Use appropriate technologies (e.g., multimedia resources, simulation) to represent the subject content	4.46	Very High
34. Use specific online applications for assessing their subject content	4.42	Very High
35. Know about the educational games specifically for their subject area	4.31	Very High
36. Select technologies to use that enhances student understanding of the subject	4.47	Very High
Overall	4.4	Very High
<b>VII. Technological, Pedagogical Content Knowledge</b>		



In our school, the Principal ensures that teachers...		
37. Teach lessons that appropriately combine their subject, technologies, and teaching approaches	4.59	Very High
38. Formulate in-depth discussion topics about the content knowledge and facilitate students' online collaboration with appropriate tools. (e.g., Google Sites,)	4.55	Very High
39. Design authentic problems about the content knowledge and represent them through computers to engage my students.	4.51	Very High
40. Structure activities to help students to construct different representations of content knowledge using appropriate ICT tools (e.g. Coggle, bubble.us, Mindmeister, Wordle).	4.37	Very High
41. Create self-directed learning activities of the content knowledge with appropriate ICT tools (e.g., Blog, WebQuests).	4.43	Very High
42. Design inquiry activities to guide students to make sense of the content knowledge with appropriate ICT tools (e.g., simulations, web-based materials).	4.46	Very High
Overall	4.49	Very High
OVERALL Level of Technological Pedagogical Content Knowledge of Teachers	4.46	Very High

The *content knowledge* indicator of TPACK has the highest mean score of 4.55 or very high which means that it was always practiced and observed. As seen on the table, content knowledge is shown in the way the principal ensure that teachers plan the sequence of concepts taught within their class ( $M=4.52$ ), have a mindset of a subject-matter expert about the content of their discipline ( $M=4.55$ ), have sufficient knowledge of their subject ( $M=4.59$ ) and develop a deeper understanding of the content of their subject area ( $M=4.57$ ). In addition, this means that teachers have the expertise to decide on the scope of concepts taught within their class ( $M=4.55$ ) and have ample understanding of the curriculum framework of their subject ( $M=4.57$ ).

This is followed by *pedagogical knowledge* with a mean rating of 4.51 or that teacher creates challenging tasks to stretch students' thinking, guide students to adopt appropriate learning strategies, guide students to monitor their own learning, help students to reflect on their learning strategies, implement varied group activities and guide students to discuss effectively during group work.

The indicator *technological pedagogical knowledge* has a mean score of 4.48 or very high, which means that it was always practiced and observed. This implies that teachers use technology to introduce real world scenarios to students, use technology to enable students to find more information on their own, help students to use technology to plan and monitor their own learning, assist students to use technology to construct different forms of knowledge representation, facilitate students to collaborate with each other using technology and help students to use web 2.0 applications in presenting what they have learned.

The indicator *pedagogical content knowledge* received a mean score of 4.47 or very high, which means that it was always practiced and observed. This implies that teachers address the common misconceptions students have about their subject without using technology, help students to understand the content knowledge of their subject through problem based learning, employ active learning strategies to deepen students understanding of the subject, use cooperative learning strategies to extend students' appreciation of the subject, use a particular strategy best suited to teach a specific concept of their subject and help students to understand the content knowledge of their subject in various ways without using technology.

The indicator *technological pedagogical knowledge (TPK)* has a mean score of 4.46 or very high, which means that it was always practiced and observed. This implies that the teachers use technology to introduce real world scenarios to students, use technology to enable students to find more information on their own, help students to use technology to plan and monitor their own learning, assist students to use technology to

construct different forms of knowledge representation, facilitate students to collaborate with each other using technology and help students to use web 2.0 applications in presenting what they have learned.

The indicator technological *content knowledge* received a mean score of 4.39 or very high, which means that it was always practiced and observed. This implies that teachers use the software that is created specifically for their specific subject, know about the technologies to use for research of the subject content, use appropriate technologies (e.g., multimedia resources, simulation) to represent the subject content, use specific online applications for assessing their subject content, know about the educational games specifically for their subject area, and select technologies to use that enhances student understanding of the subject.

*Technology knowledge* as an indicator of teachers TPACK sprung up as the lowest, though still very high, with the mean rating of 4.36, which means teachers TPACK skill is always evident among teachers. This implies that teachers have the technical skills to use the internet and computers effectively, know how to solve their own technical problems when using technology, use collaboration tools, use communication tools, and use annotating tools and use mind maps or visualization tools. This result is supported by the study of Masrifah et al. (2018) which revealed that TPACK of teachers are still constrained on components related to technology. Problems of technology knowledge could be about the teachers' beliefs about the value of technology Taimalu and Luik (2019), low level of computer literacy, absence of technology integration in the curriculum (Adnan, Wahid, Majid, Jaafar, Ismail, Wahid, Ismail, 2019), and the lack of available and accessible technological resources (Nueva, 2019).

### Relationship between the Management Skills of Education Managers and TPACK of Teachers in Private Junior High Schools in Davao City

Pearson Product Moment Correlation was used to determine whether the management skills of the education managers are significantly related with the technological pedagogical content knowledge (TPACK) of teachers in private Junior High Schools in Davao City at 0.05 level of significance. Table 3 below presents the results of the said analysis.

Table 3 shows that there is a positive strong significant relationship between the management skills of the education managers and the technological pedagogical and content knowledge (TPACK) of Junior High School teachers ( $r = 0.849$ ;  $p < 0.05$ ) since the range of  $r$  is between 0.70 and 0.90. In other words, educational managers possessing high scores of management skills tend to have teachers having high scores in their TPACK. Moreover, the result implies that the education managers possess a high level of management skills which significantly influence the level of technological pedagogical content knowledge of teachers in private Junior High School in Davao City.

**Table 3. Relationship between the Management Skills of Education Managers and the TPACK of Teachers in Private Junior High Schools in Davao City**

	r	TPACK of Junior High School Teachers		
		p-value	Decision @ 0.05 Level	Interpretation
Management Skills of Educational Managers	0.849	0	Reject H <sub>0</sub>	There is a strong significant correlation

The result is supported by Patimah (2017), who emphasized that the teachers' achiever motivation is positively influenced by the principal leadership style. In the same line, Balyer (2017) put forward that, teachers are empowered to innovate when school managers show respect. Furthermore, teachers as members of the school community actively implement ICT when school leaders show a positive attitude towards ICT

(Weng & Tang, 2014) and teachers have better teaching performance when they are effectively supervised in their academic activities (Masao, 2017).

**Management Skills of Educational Managers that Significantly Influence the TPACK of Teachers in Private Junior High Schools in Davao City**

The standard or simultaneous multiple regression analysis was used to determine which management skills of educational managers significantly influence the TPACK of Junior High School teachers at a 0.05 level of significance. In standard multiple regression, all the independent (or predictor) variables are entered into the equation simultaneously. Each independent variable is evaluated in terms of its predictive power, over and above that offered by all the other independent variables. This approach would also tell you how much unique variance in the dependent variable each of the independent variables explained (Pallant, 2016).

Prior to conducting the standard multiple linear regression analysis, the assumptions of normality, linearity, homoscedasticity, multicollinearity, and autocorrelation were satisfied first through important preliminary tests to confirm if the data could be suitable for the said analysis. First, the presence of outliers in the residuals didn't call for the conduct of data transformations since their effects were not extreme. Although Kolmogorov-Smirnov and Shapiro-Wilk tests both showed significant results ( $p < 0.05$ ) indicating a non-normal distribution of the data, the sample size of two-hundred five (205) for this study is enough to conform with the principle of central limit theorem. When the sample size is sufficiently large ( $>200$ ), the normality assumption is not needed at all as the Central Limit Theorem ensures that the distribution of residuals will approximate normality (Statistics Solutions, 2013). Upon visual inspection using histogram and Normal Q-Q plot, the shape of the distribution of the residuals are approximately normal. If the sample size is large (200 or more), it is more important to look at the shape of the distribution visually rather than calculate their significance (Field, 2018).

Moreover, all independent variables or predictors have linearity with the dependent variable. Pearson  $r$  moment correlation indicates that each management skill has a moderate to strong relationship with TPACK having correlation coefficients ranging from .631 to .825. Scatter plot also confirms the results of the Pearson  $r$  moment correlation. Additionally, the scatter plot of regression of standardized residual versus regression of predicted value does not have an obvious pattern indicating that the assumption of homoscedasticity is met.

Furthermore, each Variance Inflation Factor (VIF) value for all predictor variables is below 10 showing that the assumption of multicollinearity is not violated. It is suggested that predictor variables whose VIF values are greater than 10 may merit further investigation of multicollinearity (Ho,2014).

**Table 4. Management Skills of Educational Managers that Significantly Influence the TPACK of Teachers in Private Junior High Schools in Davao City**

Management Skills	Unstandardized Beta Coefficient (B)	SE	Standardized Beta Coefficient ( $\beta$ )	$t$	$p$ -value
Constant	.498	.159		3.128	.002
Managing Acculturation	.180	.076	.195	2.358	.019
Managing Control System	-.057	.059	-.066	-.965	.336
Managing Coordination	.056	.069	.063	.804	.422
Managing Competitiveness	-.027	.058	-.032	-.465	.642
Energizing Employees	-.068	.047	-.082	-1.451	.148
Managing Customer Service	.061	.056	.069	1.086	.279

Managing Teams	-.034	.072	-.040	-.471	.639
Managing Interpersonal Relationships	-.029	.051	-.036	-.567	.572
Managing Development of Others	.114	.060	.138	1.905	.058
Managing Innovation	.084	.057	.104	1.482	.140
Managing the Future	.154	.068	.180	2.255	.025
Managing Continuous Improvement	.005	.069	.005	.067	.947
Managing Teaching Principles	.178	.070	.191	2.528	.012
Managing Teaching Methods	.271	.074	.273	3.661	.000

$F(14, 190) = 51.534, *p < .05$

$r = .890, R^2 = .792, R^2_{adj} = .776, SE: 0.286, \text{Durbin Watson}: 1.913$

Autocorrelation is not also a problem since Durbin-Watson statistic is 1.913. Field (2009) suggests that values under 1 or more than 3 are a definite cause for concern.

For the model, ANOVA yielded a significant result for the prediction equation,  $F(14, 190) = 51.534, p < .001$ . Table 4 shows the results of standard multiple regression analysis testing which management skills of educational managers significantly influence the TPACK of teachers in private Junior High Schools in Davao City.

The result shows that the management skills of educational managers as regards to managing teaching methods ( $\beta = 0.273, p < 0.05$ ) significantly influence the TPACK of private Junior High School teachers. This implies that managing teaching methods has the highest degree of influence on the teachers' TPACK with a standardized beta of .273. This is followed with managing acculturation with a standardized beta ( $\beta$ ) of 0.195 and managing teaching principles ( $\beta = .191$ ); managing the future with a standardized beta ( $\beta$ ) of .180; managing development of others with a standardized beta ( $\beta$ ) of .138; managing innovation with a standardized beta ( $\beta$ ) of .104; managing customer service with a standardized beta ( $\beta$ ) of .069; managing coordination with a standardized beta ( $\beta$ ) of .063; managing continuous improvement with a standardized beta ( $\beta$ ) of .005; managing competitiveness with a standardized beta ( $\beta$ ) of -.032; managing interpersonal relationships with a standardized beta ( $\beta$ ) of -.036; managing teams with a standardized beta ( $\beta$ ) of -.040; managing control system with a standardized beta ( $\beta$ ) of -.066; and lastly energizing employees with a standardized beta ( $\beta$ ) of -.082.

Examining further the data in Table 4, it is seen that not all standardized betas were positive. Only nine out of fourteen indicators have a positive standardized beta ( $\beta > 0$ ). This further explains that managing acculturation, managing coordination, managing customer service, managing development of others, managing innovation, managing the future, managing continuous improvement, managing teaching principles and managing teaching methods positively contribute to the variations of teachers' TPACK. These are manifested in the results of the regression analysis where only 79.2 percent of the variance in the TPACK are explained by all fourteen management skills predictors as indicated by the  $R^2 = .792$ . This also signifies that 20.8 percent of the variation of the display of performance is attributed to other factors not included in the model.

The five indicators of management skills with negative standardized beta coefficient are managing

competitiveness ( $\beta=-.032$ ); managing interpersonal relationships ( $\beta=-.037$ ); managing teams ( $\beta=-.046$ ); managing control system ( $\beta=-.067$ ); and lastly energizing employees ( $\beta=-.081$ ). The negative result of standardized beta means that for every 1-unit increase in the identified predictor variable, the outcome variable will decrease by the beta coefficient value holding all other variables constant. For energizing employees with ( $\beta=-.081, p=.154$ ) it means that the teachers' TPACK tends to be manifested in lower degree when the said indicator is always exhibited directly to the teachers. In other words, principals who have one level increase in their energizing employees' scores tend to have teachers with .154 times lower in their TPACK. This can also be interpreted that teachers' TPACK is not 'statistically' dependent on the education manager's management skills.

According to Hui-Min Lai et al. (2018), intrinsic challenge motivation and extrinsic compensation motivation, are critical predictors of teachers' continuance use intention for teaching. In line with this, Chigona, Chigona, Davids (2014) concluded that the educators' motivation to use technology for curriculum delivery could be impacted by intrinsic motivation such as satisfaction derived from using the ICTs, individual expectations, responsibility and a sense of achievement experienced when using the technologies. Therefore, though the educators' intrinsic factors towards ICT can affect the use of the technology in the classroom, extrinsic factors, such as the ratio of learners to a computer in the school's laboratory, and ICT policies in the schools, could demotivate educators from using the technology. Which means education managers may continuously energize teachers to improve their job performances and stimulate them to perform beyond their job requirements and at the same time make necessary improvements in the policy and provide other areas of support to teachers.

**Best Fit Regression Equation Model Predicting the Level of TPACK of Private Junior High School Teachers**

The standard multiple regression analysis entered all fourteen predictors simultaneously in one full model. However, the full model (Model 1) must be reduced to a simpler model eliminating all useless and redundant predictors (management skills of educational managers) that do not contribute and explain much of the variability of the outcome variable (TPACK). To determine the other two potential models that significantly and theoretically predict the level of technological pedagogical content knowledge (TPACK) of private Junior High School teachers, stepwise multiple regression analyses using forward selection and backward elimination methods were utilized.

Model 2 was generated by stepwise backward elimination method. This is the last and best candidate model out of 10 models provided by the analysis. This model consists of four significant predictors and one non-significant predictor but has noticeable contribution to the variance of the dependent variable (TPACK). In backward elimination method, all independent variables are entered into the model at one time and then removes variables one at a time based on a preset significance value to remove. When there are no more variables that meet the requirement for removal, the process ceases (George and Mallery, 2020).

**Table 5. Model 2 as the Best Fit Regression Equation Model**

Candidate Models	Selected IVs	R <sup>2</sup>	R <sup>2</sup> <sub>adj</sub>	p-value	MSE	k + 1	Mallow's C <sub>p</sub>
Model 1 (Full)	X <sub>1</sub> , X <sub>2</sub> , X <sub>3</sub> , X <sub>4</sub> , X <sub>5</sub> , X <sub>6</sub> , X <sub>7</sub> , X <sub>8</sub> , X <sub>9</sub> , X <sub>10</sub> , X <sub>11</sub> , X <sub>12</sub> , X <sub>13</sub> , X <sub>14</sub>	0.792	0.776	0	0.082	15	15
Model 2 (Reduced)	X <sub>1</sub> , X <sub>9</sub> , X <sub>11</sub> , X <sub>13</sub> , X <sub>14</sub>	0.783	0.777	0	0.082	6	5.145
Model 3 (Reduced)	X <sub>1</sub> , X <sub>11</sub> , X <sub>13</sub> , X <sub>14</sub>	0.779	0.775	0	0.083	5	6.394



On the other hand, Model 3, the last and best candidate model out of four (4) models provided by the analysis was generated by stepwise forward selection method. This model contains only all significant predictor variables in the study. In forward selection method, the independent variables are entered into the model one at a time, based on the designated significance value to enter. The process ceases when there are no additional variables that explain a significant portion of additional variance (George and Mallery, 2020).

Although the three candidate models in Table 5 exhibit substantial explanatory power with the size of their  $R^2$  and adjusted  $R^2$ , there is still a need to set at least two criteria to identify the best fit regression model. In this study, the Mean Squared Error (MSE) and Mallow's Prediction Criterion ( $C_p$ ) were used to evaluate the three potential regression models.

The Mean Squared Error (MSE) is used to check how close estimates or forecasts are to actual values. The lower the MSE, the closer is the forecast to the actual. This is used as a model evaluation measure for regression models and the lower value indicates a better fit. In Table 5, the Mean Squared Error (MSE) of Model 2 is quite lower (MSE=.082) than Model 3 (MSE=.083) but it has the same value with Model 1 (MSE=.082). The MSE of Model 1 and Model 2 represent better quality of the regression models. According to Lavrakas (2008), a well-fitted model should have a relatively low MSE value. The model that has the lowest MSE should be considered to be the best, since it provides the best fit and offers the least biased estimate. However, Model 1 (full model) is complex since it contains all of the predictor variables (management skills of educational managers) by which some of them do not contribute well to the variance of the outcome variable (TPACK). Moreover, Model 2 possesses theoretical consistency, practicality, and simplicity as it has the higher value of adjusted  $R^2$  among the three models. The adjusted  $R^2$  decreases as useless variables are added into the model. Therefore, Model 2 is a better choice between these three models.

To finally test and specify the best regression model, the Mallow's Prediction Criterion ( $C_p$ ) was also used to evaluate the three potential models. The *Mallow's*  $C_p$  is often used to choose the "best" of the possible models (Darlington & Hayes, 2016). According to Fox (2015), a good model has *Mallow's*  $C_p$  close to or below  $k + 1$ . For the full model,  $C_p$  necessarily equals  $k + 1$ . The symbol  $k$  stands for the number of regressors or predictors and 1 represents the constant or intercept in the model. A *Mallows'*  $C_p$  value that is close to the number of predictors plus the constant indicates that the model produces relatively precise and unbiased estimates. On the other hand, a *Mallows'*  $C_p$  value that is greater than the number of predictors plus the constant indicates that the model is biased and does not fit the data well. Based on Table 5, Model 2 has a value of *Mallows'*  $C_p$  that is closest to  $k + 1$  (*Mallow's*  $C_p = 5.145$ ,  $k + 1 = 6$ ) which indicates that it's the best model that leads to the least amount of bias among the three potential models. The **smaller  $C_p$  value of Model 2 is better** as it indicates that the model has smaller amounts of unexplained error. In contrast, Model 3 is deemed to be overfit (*Mallow's*  $C_p = 6.394$ ,  $k + 1 = 5$ ).

Therefore, Model 2 is the best fit regression equation model due to its relatively higher adjusted  $R^2$  compared to the other two models. Also, it satisfies the two criteria of model evaluation using the Mean Squared Error (MSE) and Mallow's Prediction Criterion ( $C_p$ ). Model 2 has a relatively low MSE value which provides the best fit and the least biased estimate. Moreover, Model 2 has a value of *Mallows'*  $C_p$  that is closest to  $k + 1$  which indicates that it's the best model that has the least amount of bias and has smaller amounts of unexplained error among the three potential models. Lastly, it possesses theoretical consistency, practicality, and simplicity for having the five predictor variables that statistically contribute to the variance of the dependent variable. In the process of selecting Model 2 as the best fit model, the stepwise approach using backward elimination is useful because it reduces the number of predictors, reducing the multicollinearity problem and it is one of the ways to resolve the overfitting. According to Elliott and Woodward (2007), some researchers argue that backward elimination procedures are preferable to the forward selection and stepwise procedures. Among other issues, it has been shown that in forward selection

and stepwise approaches, the  $R^2$  values are biased high, and the resulting  $p$ -values do not have proper meaning. These problems are not as severe in backward elimination methods.

Furthermore, ANOVA shows that Model 2 is statistically significant in predicting TPACK,  $F(5,199) = 143.282$ ,  $p < .001$ ,  $R^2 = .783$ . Also, only five (5) out of fourteen (14) predictors from management skills of educational managers were included in Model 2 for having valuable contribution to the variance of TPACK. These are the managing acculturation ( $B = .158$ ,  $\beta = .172$ ,  $p = .005$ ), managing development of others ( $B = .094$ ,  $\beta = .114$ ,  $p = .072$ ), managing the future ( $B = .170$ ,  $\beta = .199$ ,  $p = .004$ ), managing teaching principles ( $B = .196$ ,  $\beta = .210$ ,  $p = .004$ ), and managing teaching methods ( $B = .273$ ,  $\beta = .275$ ,  $p = .000$ ). Only four variables, managing acculturation, managing the future, managing teaching principles, and managing teaching methods added significantly to the prediction while managing development of others is not statistically significant with a standardized beta coefficient of .114 ( $\beta = .114$ ,  $p = .072$ ) or effect to the dependent variable (TPACK).

Overall, Model 2 explains that 78.3 percent in the variation of TPACK of teachers in private Junior high schools can be at least predicted by or attributed to the five remaining predictor variables (management skills of educational managers). According to Hair et al. (2013), an  $R^2$  of .75 is considered as substantial. Moreover, the best fit multiple regression equation model that is obtained or derived from the data for predicting the dependent variable (TPACK) from the set of independent variables is given by

$$\hat{y} = b_0 + b_1X_1 + b_9X_9 + b_{11}X_{11} + b_{13}X_{13} + b_{14}X_{14} + \epsilon \quad (\text{Equation 1})$$

where  $\hat{y}$  = predicted value of the dependent variable,  $b_0$  = constant (y-intercept),  $b_1$  to  $b_{14}$  = unstandardized regression coefficients of independent variables (X),  $X_1$  = Managing Acculturation,  $X_9$  = Managing Development of Others,  $X_{11}$  = Managing the Future,  $X_{13}$  = Managing Teaching Principles,  $X_{14}$  = Managing Teaching Methods, and  $\epsilon$  is the model's random error term (residual, usually neglected). From the analysis in Table 5, the derived multiple linear regression model can be expressed as:

$$\hat{y} = .481 + .158X_1 + .094X_9 + .170X_{11} + .196X_{13} + .273X_{14} \quad (\text{Equation 2})$$

Below, Model 2 was used to simulate the prediction of the TPACK of teachers ( $\hat{y}$ ) using the educational managers' management skills scores from a randomly selected respondent through the substitution of values or scores of the independent variables (X).

$$\hat{y} = .481 + .158(5) + .094(4) + .170(4.80) + .196(4.80) + .273(5) \quad \hat{y} = 4.77 \quad (\text{Equation 3})$$

In the simulation of Model 2 as the best fit multiple linear regression equation model, it shows that the TPACK of a randomly selected private Junior High School teacher can be predicted to be 4.77 given the set of values of educational managers' management skills. Also, it must be noted that for one unit increase in any of the included management skills in the model is a one unit increase in the TPACK of teachers in private Junior High Schools in Davao City holding all other variables constant. This suggest that the TPACK of teachers can be predicted, improved, and advanced with the manipulation of these said management skills. A similar study conducted by Dong, Xu, Chai (2020) among teachers in China showed that administration support predicts teachers' computer self-efficacy. Thus, this supports the result of the current study that teachers' TPACK are being influenced in part by the management skills of education managers.

## CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary of the findings, the conclusions based on the findings and the

recommendation generated from the findings and conclusions.

This study was conducted to determine the management skills of educational managers which significantly influence and predict the technological pedagogical content knowledge (TPACK) of teachers in private Junior High Schools in Davao City covering the school year 2020-2021 using a multiple linear regression equation model.

The primary aim of the study comprised of obtaining an accurate data on the level of management skills of educational managers in terms of managing acculturation, managing control system, managing coordination, managing competitiveness, energizing employees, managing customer service, managing teams, managing interpersonal relationships, managing development of others, managing innovation, managing the future, managing continuous improvement, managing teaching principles and managing teaching methods and the level of technological pedagogical content knowledge of the Junior High School teachers in terms of technology knowledge, content knowledge, pedagogical knowledge, pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge.

To find the answers to the foregoing questions, the researcher conducted a survey to the teachers in private Junior High Schools in Davao City. The researcher employed a descriptive-correlation method of research using an adapted questionnaire as the research instrument in gathering the data. The statistical tools used in interpreting and analyzing the data were Mean, Pearson Product Moment Correlation Coefficient or Pearson  $r$ , and Multiple Linear Regression using the Stepwise Method.

The findings of the study are as follows:

The level of management skills of education managers in terms of managing acculturation, managing control system, managing coordination, managing competitiveness, managing customer service, managing teams, managing interpersonal relationships, managing development of others, managing innovation, managing the future, managing continuous improvement, managing teaching principles and managing teaching methods were interpreted to be very high except for energizing employees, which has a mean result interpreted to be high.

On the other hand, the level of technological pedagogical content knowledge of teachers in private Junior High Schools in terms of technology knowledge, content knowledge, pedagogical knowledge, pedagogical content knowledge, technological content knowledge, technological pedagogical knowledge, and technological pedagogical content knowledge were interpreted to be very high.

Moreover, the Pearson Moment Correlation showed that there is a significant relationship between the management skills of educational managers and the technological pedagogical content knowledge of teachers in private Junior High schools.

Also, the Standard Multiple Linear Regression Analysis using the Stepwise Method showed that the educational manager's management skills such as managing acculturation, managing the future, managing teaching principles, and managing teaching methods significantly predict the technological pedagogical content knowledge (TPACK) of private Junior High School teachers.

Finally, the final multiple regression equation model significantly predicts the level of technological pedagogical content knowledge (TPACK) of private Junior High School teachers. The final best fit model includes only five management skills that have relatively contribute to the variation of TPACK. These are the managing acculturation, managing development of others, managing the future, managing teaching

principles, and managing teaching methods.

## Conclusions

Based on the findings of the study, the following conclusions are presented:

The management skills are always evident among education managers in Junior High Schools in Davao City. This indicates that principals are highly skilled at planning, organizing, controlling, coordinating, motivating, and supervising activities in the fields of teaching, student affairs and public relations. Similarly, they are passionate about education, and this is manifested in the way they manage curriculum implementation.

Technological pedagogical content knowledge of teachers in private Junior High schools in Davao City is always practiced and observed. This is manifested in terms of their deep knowledge of the content areas, educational technology applications and method and practice of teaching. This emphasizes that teachers integrate relevant technology effectively in their lessons. Similarly, it indicates that they are adept in using varied applications and its appropriate use in their lesson to enhance students' learning experience.

A strong significant relationship exists between the management skills of educational managers and the technological pedagogical content knowledge (TPACK) of Junior High School teachers. As the level of the educational managers' management skills increases, the level of teachers' technological pedagogical content knowledge (TPACK) also increases. Principals who possess good management skills have teachers with good level of TPACK. This also means that, teachers are more motivated to take the initiative in making improvement, with the guidance and positive engagement by educational managers.

Certain management skills of educational managers influence the technological pedagogical content knowledge of Junior High School teachers. This indicates that educational manager's management skills are significant in managing technological changes in organizations and results to the improved teacher practices in providing quality teaching and learning practice with technology integration.

The best fit model generated through Stepwise method shows that these management skills: managing acculturation, managing development of others, managing the future, managing teaching principles, and managing teaching methods have relatively contributed to the variation of the teachers' TPACK. Which means that the TPACK of teachers can be predicted, improved, and advanced with the manipulation of the said management skills. Teachers who were provided trainings and effectively supported through supervision in their conduct of classes would have an increased desire to learn to integrate new technology and thus, master the technology until it becomes their working norm.

## Recommendations

Based on the findings and conclusions, the following recommendations are put forward to those concerned:

For the Department of Education Program Implementers, it is recommended that they may establish strong linkages with non-government organizations and other stakeholders to help facilitate the integration of ICT in schools in the private sector. They may also design programs and trainings to strengthen the management skills of educational managers especially on those areas where they need improvements which is highly beneficial in sustaining the advancement of the technological pedagogical content knowledge of teachers in the private junior high schools.

Moreover, the school principals are recommended to establish a clear vision and goals for technology in the

school by providing professional development opportunities for subject supervisors, teachers and staff that emphasize the use of technology and that facilitate integration of technology in student learning. They may also conduct series of supervision workshop to further strengthen school managers' managing skills specifically in energizing teachers.

Furthermore, teachers are encouraged to participate in relevant faculty development sessions that would continuously enhance their skills in TPACK. Teachers are encouraged to take part in learning sessions, become more collaborative and extend learning beyond the classroom. They may create learning communities composed of students; fellow educators in schools, experts in various disciplines around and other school stakeholders to have access to instructional materials as well as the resources and tools to create, manage, and assess their quality and usefulness.

Lastly, future researchers may conduct another study to determine how other indicators in the study influences the teachers' pedagogical content knowledge. Qualitative or mixed research study is highly recommended. They may also use the results of this study as a basis for future related research endeavors to explore other factors not described or included in the study.

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