

Research Article

ALIGNMENT OF THE REVISED SECONDARY TEACHER EDUCATION CURRICULUM AND THE HIRING QUALIFICATIONS FOR SHS TEACHERS IN THE PHILIPPINES: A THEORETICAL GAP ANALYSIS

Received: June 5, 2019

Revised: September 26, 2019

Accepted: December 12, 2019

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Abstract

This theoretical gap analysis evaluates the alignment of the revised teacher education curriculum and the qualifications for Senior High School (SHS) teaching positions. The analysis is guided with Technological Pedagogical Content Knowledge (TPACK) Framework for teachers (Mishra & Koeler, 2006) by matching four artefacts to examine the alignment. The revised policies, standards and guidelines for Bachelor of Secondary Education (Commission on Higher Education Memorandum No. 75, s. 2017) is matched with the technological, pedagogical, and content knowledge requirements for SHS teaching positions reflected in the Philippine Professional Standards for Teachers (PPST), hiring guidelines for SHS teaching positions, and strand scheduling of subjects, respectively. Results reveal that in terms of technological knowledge, an alignment between the revised teacher education curriculum and PPST is notable but becomes potentially at risk of being misaligned when Technology for Teaching and Learning courses 1 and 2 are matched with SHS subjects because both courses failed to regard extensive lists of other technologies applicable for STEM education and their periodically altering landscape. The new teacher education curriculum also responds well to the pedagogical requirements for SHS teaching qualifications except for a major drawback, that is providing inappropriate clinical experiences. As to content courses, the revised teacher education curriculum excludes some courses very relevant to SHS teaching especially in science education. These results imply the need to add an additional year to the existing curriculum to intensify content, pedagogy, and technology trainings for pre-service SHS teachers if the program is intended for both use (i.e. Junior High School and SHS teaching preparation) or open a new program specific for SHS pre-service teachers.

Keywords: Teacher Education Curriculum, Senior High School Curriculum, STEM Education

Introduction

The basic education in the Philippines is expanded to 13 years pre-university cycle by virtue of Republic Act 10533 (i.e. compulsory one year kindergarten and two years SHS education) (Sarvi, 2015). This is aligned with the Philippine constitutional provisions (e.g. Article II Section 17 and Article XIV) emphasizing the primordial significance of education to the state and its people (Sergio, 2011). Needless to say, the country is also a signatory to international agreements like the Washington Accord as well as the ASEAN and APEC Mutual Recognition Projects of which it has to respond to. However, no curricular program is designed which will prepare pre-service SHS teachers to deliver the SHS curriculum prior to the inception and even up to date, thus, human resource is one of the enduring issues (Ibid.).

In this regard, the Department of Education (DepEd) hires interested teachers, professionals, and experts to teach in SHS since 2016 regardless of their trainings, experience and license (should only pass the licensure examination five years from the date of appointment) as long as the applicant is a bachelor's degree holder with earned 15 units of advanced specialization subjects relevant to the strand or a TESDA NC II certificate (DepEd, 2018). The challenge in this hiring system lies on attracting prospects, recruiting, and retaining them when the remuneration is not competitive. Salary greatly affects the type of teacher who works in the field and determines how long they stay in the job (Vegas, 2007). High earning practitioners such as lawyers, doctors, accountants and even college instructor receiving comparable salary grade with secondary teachers are not guaranteed to teach in DepEd. With the protracted breadth of tasks the teacher has in basic education, it is never a practical option.

Other initiative taken by DepEd as a response to inadequate supply of qualified SHS teachers is recruiting faculty members from Higher Education Institutions (HEIs) provided that they undertake retooling (Acosta & Acosta, 2016). Some Junior High School (JHS) teachers are also assigned to teach SHS subjects but with no clear-cut guidelines on salary and incentive adjustments (Hernando-Malipot, 2017). To some extent, both can still be classified as out-of-field teachers – those teaching not aligned with their field or having insufficient number of training and minimal qualifications (Ingersoll, 2002) regardless if they are from HEIs or JHS because pedagogical and content requirements for SHS are never analogous to both (Lucenario et al., 2016). This practice may be prevalent already in many countries but it has also undergone considerable deliberations in educational communities because of concerns associated with negative impact on learners, teachers, and the broader academic community (McConney & Price, 2009). In fact, such practice was once described as education's "dirty little secret" (Ingersoll, 2002).

Fortunately, a new curriculum was released by the Commission on Higher Education pertaining to revised policies, standards and guidelines for Bachelor of Secondary Education (BSEd) (CHED Memo no. 75, s. 2017) replacing the existing teacher education curriculum (CMO No. 30, s. 2004). This curriculum does not provide clarification if it is also designed to capacitate SHS pre-service teachers, but its graduates will likely participate in SHS teaching force in 2022 and beyond given that no curriculum is specially designed for them. In this regard, this theoretical gap analysis is designed using TPACK as framework for evaluating curriculum alignment of the revised teacher education curriculum with the qualifications for SHS teaching positions.

TPACK is teacher's professional knowledge which supports technology integration in a content-based instruction. In other words, this is characterized by synergistic intersections of teachers' knowledge on curriculum content, pedagogies, technologies, and contextual influences upon learning (Koehler & Mishra, 2008). In teacher education institutions, this is a useful framework informing curriculum developers what to prepare and include in pre-service teachers' curriculum which aligns to the technological, pedagogical, and content knowledge requirements of teaching profession (Baran et al., 2011; Martin, 2015; Tanak, 2018). Likewise, this study answers the following research question: What is the extent of alignment of the revised Secondary Teacher Education Curriculum (CMO No. 75, s. 2017) vis-à-vis the hiring qualifications for SHS teachers in the Philippines? This is of an international concern because even developed countries such as the USA, Australia, and South Africa are allowing teachers to teach subject regardless if it is not their field of specialization (*i.e.* out-of-field teachers) before as reported from several studies which negatively affects the teachers and their learners (Plessis, n.d.; Ingersoll, 2002; McConney, et al., 2009).

The Theoretical Framework

TPACK is an extension of Shulman's (1986) idea of Pedagogical Content Knowledge (PCK) "the body of understanding, knowledge, skills, and dispositions that a teacher needs to perform effectively in a given teaching situation" (Wilson et al., 1987). It is a revolutionized framework which attempts to capture indispensable forms of knowledge needed among teachers for technology application in teaching while responding to multifaceted nature of teachers' knowledge (Mishra & Koehler, 2006). As reflected in Figure 1, the framework has three fundamental forms of teachers' knowledge on technology, pedagogy, and content. Equally important to these are the intersections among them, indicated as pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), and technological, pedagogical, and content knowledge (TPACK). However, only the three main components are used as bases for gap analysis. The other forms of knowledge in the framework and the amalgamation itself are implicit in both curricula, thus, difficult to conduct inventories for linear alignment examination. The definitions of the three forms of teacher's knowledge are presented below.

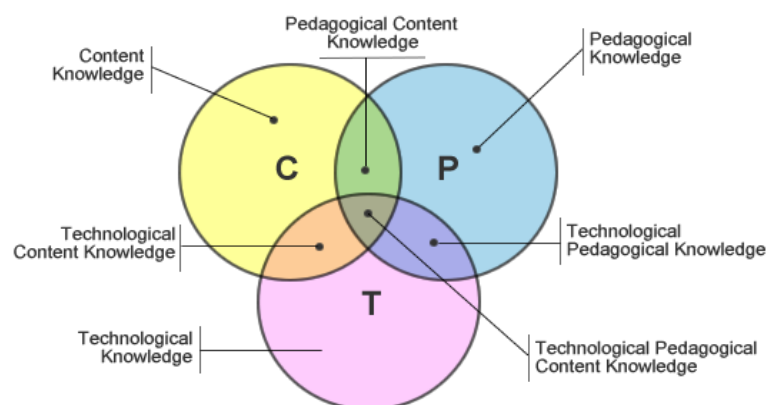


Figure 1 Technological Pedagogical Content Knowledge (TPACK) Framework for Teachers

Technology knowledge (TK) refers to knowledge on touchstone and advanced technologies like the Internet as well as digital video. This involves also the skills to operate certain technology and adapt to its continually changing landscape irrespective of what technology it is (Mishra et al., 2006, pp. 1027-1028)

Pedagogical knowledge (PK) is a deep knowledge on the processes and practices or methods of teaching and learning and how it encompasses on overall educational purposes, values, and aims. Hence, PK requires an extensive understanding on the following: cognitive, social, and developmental theories of learning and their classroom applications (Mishra et al., 2006, pp. 1026-1027);

Content knowledge (CK) is knowledge on the actual subject matter (Shulman as cited in Mishra et al., 2006). It also comprises knowledge on central facts, concepts, theories, and procedures in a given discipline or field; knowledge of explanatory frameworks organizing and connecting ideas; and knowledge of the rules of evidence and proof (Mishra et al., 2006, p. 1026). Because the framework is focused on designing and evaluating teacher's knowledge which is concerned on effective learning in different content areas, it is a useful frame on what knowledge teachers need to integrate technology into teaching and how they might develop this knowledge. In addition, we could identify which professional development program or in-service teacher trainings are relevant (Schmidt et al., 2009).

Methodology

This theoretical gap analysis examines the linear alignment of the revised curriculum for BSEd with the qualification standards for SHS teaching positions using document analysis as the research method. It is a systematic procedure for reviewing, evaluating, and interpreting contents of documents either printed or electronic material to elicit meaning, gain understanding, and develop empirical knowledge (Corbin & Strauss, 2008). In this study, the new teacher education curriculum (CHED Memo No. 75, s. 2017) is analyzed on what technological, pedagogical, and content knowledge are contained to prepare prospect SHS pre-service teachers although the Technological Pedagogical Content Knowledge (TPACK) framework by Mishra and Koeler (2006) has seven intersections. These knowledge contained in the curriculum are matched with the technological, pedagogical, and content knowledge requirements for SHS teaching positions reflected in the Philippine Professional Standards for Teachers (PPST) (DO No. 42, s. 2017), hiring guidelines for SHS teaching positions (DO No. 3, s. 2016), and strand scheduling of subjects, respectively. In terms of content knowledge, the focus is limited only on pre-service teachers or graduates to be produced by science and mathematics education matching to the essential qualifications for teachers in Science, Technology, Engineering, and Mathematics (STEM) curriculum. In a nutshell, this theoretical gap analysis can be summarized by the conceptual framework presented in Figure 2. It can be deduced that the goals of this analysis are to seek alignment, possible prevailing gaps, and eventually provide implications in the event irregularities in the alignment are observed between the new teacher education curriculum with the qualification standards for SHS teaching positions.

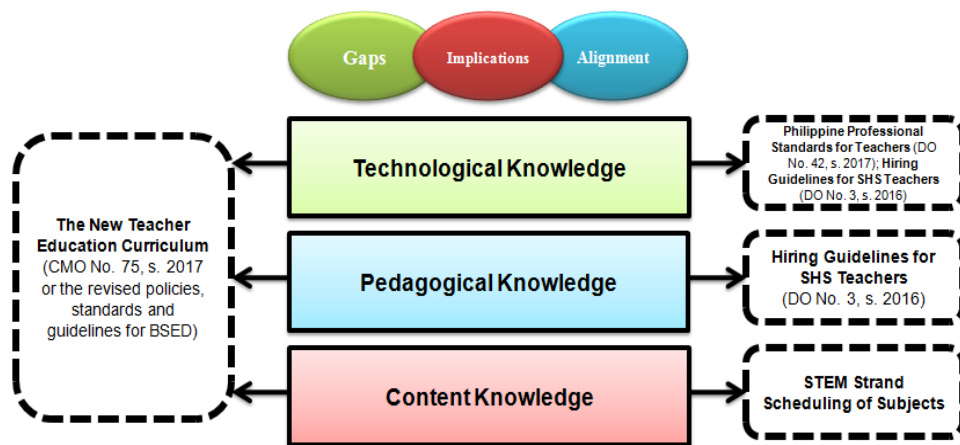


Figure 2 Conceptual Framework of the Theoretical Gap Analysis

The Artefacts

Four artefacts are used in this theoretical gap analysis. These are described below:

1. The revised policies, standards and guidelines for BSED (CHED Memo No. 75, s. 2017) is the new teacher education curriculum to be implemented in 2018. It is a “shift to learning-competency based standards/outcomes-based education” responsive to the 21st Century Philippine Teacher Education Framework and is anchored on the significant characteristics of the enhanced basic education curriculum, Philippine Qualifications Framework (PQF), PPST, and other relevant documents. The layout of the curriculum regardless of specialization is divided into four broad curricular areas: (a) General Education Courses (GEC) (CMO No. 20, series of 2013); (b) Professional Education Courses (PEC); (c) Major/Content Courses (CC) (e.g. English, Mathematics, Science, Filipino, etc.); and, (d) Mandated Courses (MC) like Physical Education and NSTP. This artefact is aligned then with the qualifications for SHS teaching position reflected in the following artefacts to examine alignment and possible prevailing gaps.

2. PPST “sets clear expectations from teachers on their career stages of professional development from beginning to distinguished practice” (DepEd, 2017, p. 1). These expectations are translated into seven domains for effective teaching in the 21st century of which two of the domains stipulate the needed technology knowledge for teachers (Ibid.). Hence, this is a viable artefact for examining alignment with the technological knowledge to be taught in both content and professional education courses of the new PSG of BSED program, and the demands for SHS teaching reflected in PPST. Also, the hiring guidelines for SHS teaching positions (DepEd, 2016) sets technology knowledge requirement for SHS teaching which are assessed by evaluation and selection committee during application process but not that too explicit.

3. The pedagogical knowledge qualifications are established in the hiring guidelines *for SHS teaching positions* (DepEd, 2016). These qualifications are explicitly listed of which the evaluation and selection committee has to observe during the interview and teaching demonstration or application process as well. To check whether the pedagogical demands of SHS teaching position are satisfied in the professional education courses to be offered in the revised teacher education curriculum, both artefacts are matched.

4. DepEd released the scheduling of subjects in all SHS strands but this gap analysis will utilize only that of STEM strand matching with the content courses offering in science and mathematics education. The scheduling of subjects when conceived is categorized into three areas: contextualized, core, and specialization subjects. In this analysis, matching only involves the STEM specialization subjects and content courses in both science and mathematics education.

On Technological Knowledge Alignment

The revised PSG for BSEd program capacitates pre-service teachers with relevant technology knowledge for teaching and learning. It allocates two courses in the curriculum of which one is to be taught as PEC and the other as CC. This is contrary to its mapping in the preceding PSG for Undergraduate Teacher Education Curriculum (CHED, 2004). Its equivalent courses (i.e. Educational Technology 1 and 2) were both mapped under PEC with the goal of introducing educational technology and media as well as the theories and principles behind their use, development, and utilization in the classroom; and, developing project-based learning (PBL) unit portfolios using ICT and web-enhanced activities of learning (Febro & Buan, 2013). In the context of the revised curriculum (CHED, 2017), course titles are modified to Technology for Teaching and Learning (TTL) 1 and 2 but courses' goals are sustained with the inclusion of competencies such as ICT policies and safety issues, social, ethical, and legal responsibility in its use, and among others. Also, the teaching of the course has become specific to the specialization mapping TTL 2 as a content course with the purpose of having pre-service teachers/students the ability to apply, design, produce, utilize, and evaluate ICT materials depending on the enrolled content courses. This course also requires a major output which is an ICT and PBL plan aligned with the enhanced basic education curriculum. The learning competencies reflected in both TTL 1 and 2 are all relevant technology knowledge but apparently demand ample amount of time given its expanded scope. Six units or two courses may not be adequate.

Table 1 Courses Developing Technology Knowledge and the Requirements in SHS teaching positions as reflected in PPST and Hiring Guidelines

Technological Knowledge Requirements for SHS Teachers	Aligned Technology Knowledge taught in the revised BSEd program	Gaps
Philippine Professional Standards for Teachers	Technology for Teaching and Learning (TTL) 1 and 2	
Domain 1. Content Knowledge and Pedagogy	2. ICT Policies and Safety Issues in Teaching and Learning	
Strand 1.3. Positive Use of ICT	9. Social, Ethical and Legal	
Domain 4. Curriculum and Planning	Responsibilities in the Use of	
Strand 4.5. Teaching and Learning Resources including ICT	Technology Tools and Resources	

Technological Knowledge Requirements for SHS Teachers	Aligned Technology Knowledge taught in the revised BSEd program	Gaps
Hiring Guidelines for SHS Teaching Positions Technology/computer skills	Technology for Teaching and Learning (TTL) 1 and 2 + surplus technology knowledge equipped among pre-service teachers in the curriculum which are essential but not assessed in the hiring process and even in the PPST	
Courses in SHS STEM Strand	Technology for Teaching and Learning (TTL) 2 ICT and PBL plan aligned with the enhanced basic education curriculum	Disregard robots, as well as augmented reality, online gaming, virtual laboratories, international collaborative projects, real-time formative assessment and skills-based assessment

Looking on its positive aspect, these technology knowledge that both courses will offer show notable alignments with the qualifications for SHS teaching position and the PPST as reflected in Table 1. The hiring guidelines may only assess tangible knowledge (i.e. computer skills as used in demonstration teaching) in a short span of time during application process but two domains in PPST (i.e. content knowledge and pedagogy, and curriculum planning) will sustain the assessment by way of determining teachers' professional development. This is anchored on the principle that learning is lifelong; hence, teachers calibrate and refine their practices as a response to the complexities of reforms in education (DepEd, 2017).

The PPST sets an expectation that every teacher will not just show skills in positive use of ICT but also to mentor colleagues in its implementation in the long run. Positive use of ICT is defined as "responsible, ethical or appropriate use of ICT to achieve and reinforce learning" (DepEd, 2017, p. 26) of which such qualification standards are very aligned with the competencies being developed in TTL 1 of the new teacher education curriculum (PEC 2 and 9). This is a very distinctive feature that both Educational Technology 1 and 2 in the old curriculum failed to capacitate the pre-service teachers. In fact, ICT before was just integrated in the instructions for teacher training in order to prepare pre-service teachers in their roles in an ICT-laden society, model its integration in teaching-learning process, sustain its application, reap its full benefits, and expand pre-service teachers' perspective on its effective integration not emphasizing much on its ethical protocols and practices in its use (Peralta – Ruales & Adriano, 2011) which supposedly involve intellectual property, digital information and online security, cyber bullying, respecting audience, and seeing themselves as both creators and users of ICT (The Safe, Responsible and Ethical use of ICT, 2013). Much probably because innovative ICTs

have just totally permeated the classroom recently and as these evolve, ethical issues become imperative to ensure its effective use (Mayes et al., 2015)

Other qualification set in PPST is on the knowledge of use of ICT resources in teaching and learning process. These pertain to basic forms of technology knowledge which are verifiable and are also assessed on the onset of application as reflected in the hiring guidelines since all applicants undergo interview and demonstration teaching (DepEd, 2016); and by just considering the course descriptions of both TTL 1 and 2, qualifications and standards in both hiring guidelines and PPST exhibit remarkable alignment. In fact, there is even surplus technology knowledge equipped among pre-service teachers in the curriculum which are essential but not really assessed in the hiring process and even in the PPST.

However, this alignment becomes potentially at risk of being misaligned when the courses are matched with SHS subjects provided that both failed to regard extensive list of other educational technologies available and their recurrently changing landscape. Digital gaming, simulation, and social networking may have been emphasized (Klopfer et al., 2009) or taught in the new curriculum but in the case of STEM education, Wu and Anderson (2015) stressed that educational technologies in this academic strand is much more advanced covering online interactive learning environments, robots, as well as augmented reality. In addition, five technology-supported pedagogic models such as online gaming, virtual laboratories, international collaborative projects, real-time formative assessment and skills-based assessment are not added on the list (Kärkkäinen & Vincent-Lancrin, 2013). Educators and researchers trust the merits of these technologies in improving STEM education (Wu & Anderson, 2015), hence, these must have been included in the curricular competencies. However, a sufficient amount of time and high caliber teaching individuals are also needed to transfer these forms of knowledge among SHS pre-service teachers.

The problem if the curriculum will really be used for SHS pre-service teacher preparation, the technology knowledge qualifications or standards for SHS teaching positions will remain minimal to the point that if it does not meet the supposed needs of SHS STEM students.

On Pedagogical Knowledge Alignment

Pedagogy is a specialized knowledge of teachers pertaining to classroom management, assessment, teaching methods, lesson planning, learning processes, individual student, and the ability to adapt on students' individual differences of which teachers use to create effective teaching and learning environments (Guerriero, n.d.). In the existing CMO, these pedagogical knowledge (PK) are embedded and taught in professional education courses categorized into three themes: foundations/theories and concepts of education, methods and strategies of teaching, and experiential learning as shown in table 2. Their purposes are to develop broad repertoire of perspective, professional capacities, sensibilities and skills in teaching (National Council for Teacher Education, 2009). Also, these provide pre-service teachers an understanding on school subjects and their pedagogic approaches in the concrete context of the school and the learner by forging linkages among learner, context, subject discipline and the pedagogical approach (Patra, 2016).

Table 2 Professional Education Courses and Pedagogy Knowledge Requirements for SHS teaching positions

Pedagogical Knowledge Requirements for SHS Teachers	Aligned Pedagogical Knowledge taught in the revised BSEd program	Gaps
Hiring Guidelines for SHS Teaching Positions	Foundation Courses	
Demonstration Teaching	1. The Child and Adolescent Learners and Learning Principles	
a. Lesson Planning and Preparation	2. The Teaching Profession	
b. Classroom Management	3. The Teacher and the Community, School Culture and Organizational Leadership	
c. Teaching Learning Process	4. Foundation of Special and Inclusive Education	
d. Language Proficiency		
e. Assessment of Learning Outcome		
f. Reinforcement of Learning		
Interview	Methods and Strategies	
a. Teaching Ability	1. Facilitating Learner Centered Teaching	
b. Classroom Management:	2. Assessment in Learning 1	
c. School Fit	3. Assessment in Learning 2	
	4. Technology for Teaching and Learning 1	
	5. The Teacher and the School Curriculum	
Clinical Experience		Experiential Learning
		1. Field Study 1
		2. Field Study 2
		3. Teaching Internship

Fortunately, there is an alignment with what professional education courses will intend to teach or develop among pre-service teachers on the pedagogical pre-requisites of SHS teacher. These pertain to the ability to craft effective lesson-plans, design instructional strategies and assessment, provide ambitious goal for student success, address multiple needs of the students, maintain high expectations for students when confronted with setbacks, demonstrate ability to encourage positive student behavior, and deal effectively with negative student behavior (DepEd, 2016). As long as these prescribed PK are acquired and applied when they become in-service teachers, students will certainly lead to substantial improvements in terms of their wellbeing, engagement, and learning outcomes (Goldspink et al., n.d.; UNESCO, 2005).

There is one major drawback, however, when BSEd curriculum will continually be used as training ground for SHS pre-service teacher applicants. This will persist to provide clinical experiences misaligned with that of SHS teaching requirement. Internship supposedly prepares them to actual classroom teaching of which they undergo proper and adequate monitoring, supervision, and guidance with their cooperating or supervising teachers (Ulla, 2016; Starkey & Rawlins, 2012). In addition, it equips them by all account with preliminary job knowledge and experiences by provision of rationales for specific pedagogies, techniques to adapt to various

styles of learning, and approaches to address difficult materials, thus enhancing their chances for employability in the competitive labor market (Phoebe, 2010; Hemmerich et al., 2015). There had been much studies disclosing that relevant or aligned experience is one of the crucial bases for job admission (e.g. Moreau & Leathwood, 2006; Helyer & Lee, 2014; O'Leary, 2016). But in the instance that a certain pre-service teacher takes his intern in JHS but later apply for SHS teaching position, he becomes irrelevant to the demand of the marketplace (Jean et al., 2012). Much more when he applies for a teaching position in which he will be assigned to teach courses not related to his academic major. Pedagogy varies according to subject matter and Philippines is not exempted in the prevalence on the issue of out-of-field teaching. It becomes a metaphor when one's internship experience is not preparing him to his prospected teaching position.

On Content Knowledge Alignment

Content courses of the revised undergraduate teacher education curriculum do not perfectly align with the specialized subjects offered in STEM Strand on the following grounds:

1. There are topics in General Biology 2 such as origin and evolution of biodiversity, systematics based on evolutionary relationship, and processes in plants and animals having no equivalent or aligned courses in science education of the new curriculum (DepEd, 2016). The five courses allocated for biological sciences are insufficient displacing zoology, botany, origin and evolution of biodiversity, systematics and among others which supposedly will explicitly explain the aforementioned contents.

2. Students in STEM strand will be required to identify a scientific, technological, or mathematical problem worthy for investigation and preparation of scientific report as major requirement for their research subject or capstone project (DepEd, 2016). Conversely, research in science and mathematics education prepares pre-service teachers to craft research in teaching addressing problems, issues, and concerns in science and mathematics teaching and learning. Such may be an action research in the content or pedagogy of science or mathematics and not Science or Mathematics Investigatory (CHED, 2017). Hence, inconsistency in both curricula is also notable.

Table 3 Science and Math Content Courses Matched with STEM Specialized Subjects

STEM Specialized Subjects	Aligned Courses in Mathematics and Science Education Offered in the Revised Curriculum
General Biology 1 (Cell, Biological Molecules, Energy Transformation)	Biology Courses
General Biology 2* (Genetics, Origin and Evolution of Biodiversity*, Systematics Based on Evolutionary Relationship*, Compare and Contrast Processes in Plants and Animals*)	Genetics; Cell and Molecular Biology; Microbiology and Parasitology; Anatomy and Physiology; Environmental Science
General Chemistry 1 and 2 (Composition, Structure, and Properties of Matter, Quantitative Principles, Kinetics, and Energetics of Transformations of Matter, Fundamental Concepts of Organic Chemistry)	Chemistry Courses
	Inorganic Chemistry; Organic Chemistry; Biochemistry Analytical Chemistry

STEM Specialized Subjects	Aligned Courses in Mathematics and Science Education Offered in the Revised Curriculum
General Physics 1 (Mechanics of Particles, Rigid Bodies, and Fluids Waves, Heat and thermodynamics)	Physics Courses Thermodynamics; Modern Physics; Electricity and Magnetism
General Physics 2 (Electricity and Magnetism, Optics, Basics of Special Relativity, Atomic and Nuclear Phenomena)	Waves and Optics; Fluid Mechanics
Pre-Calculus (Analytic Geometry, Series and Mathematical Induction, Trigonometry)	Calculus 1 with Analytic Geometry; Calculus 2; Calculus 3
Basic Calculus (Limits and Continuity, Derivatives, Integration)	
Research or Capstone Project* (Identification of a scientific, technological, or mathematical problem, design and application of an appropriate methodology, formulation of hypothesis, and drawing conclusions based on investigation, Preparation, presentation, and defense of research output)	NONE

** means no aligned course in the revised teacher education curriculum*

These are only some of the perceived misalignment in terms of content knowledge to be taught in science and mathematics education of the revised curriculum and that needed in STEM curriculum. The analysis even excludes how the revised teacher education curriculum fits with the need of other SHS strands in four tracks (i.e. academic, sports, arts and design, as well as TVL). Hence, when graduates of this curriculum will participate in SHS teaching force particularly in STEM, they can be considered out-of-field teachers taking into account that they will teach inadequate content knowledge on certain competencies (Ingersoll, 2002). The exclusion of fundamental biological sciences such as ecology, botany, zoology, and systematics in the case of science education curriculum for an instance is no good because these would supposedly prepare pre-service teachers to teach some concepts in General Biology 2. Nevertheless, they would teach the subject. The impact of out-of-field phenomenon would only add complexity to the education environment affecting the broad educational communities as it will jeopardise effective teaching and quality learning (Plessis, n.d.). The DepEd may be able to hire professionals or experts of certain discipline as a response to this problem but this may not be sustainable and will likely be a collection only of content specialist. There is a need for teachers who can marry content and pedagogy plus technology or the knowledge of utilizing variety of technologies in teaching and/representing and/ facilitating creation of knowledge in particular subject content.

Implications

The fusion of content/major courses to align with the feature of spiral progression such as the case in science education has led to the congestion of curriculum and displacement of relevant courses in the teacher education program. This revised PSG for secondary teacher education curriculum may fit so well for preparing pre-service JHS teachers but not for pre-service SHS teachers. The curriculum even excludes the teaching of more advanced spectra of technology for teaching and learning in SHS as well as the provision of appropriate or aligned clinical experiences. To address these gaps, there is a need to add an additional year

to the existing curriculum to intensify content, pedagogy, and technology training for pre-service SHS teachers. This amount of time will be for allocated for offering of general education, professional, and content education courses which are displaced or not offered in the new teacher education curriculum but are relevant in the teaching of SHS curriculum. Other option may involve opening a new program which courses are constructively aligned with SHS curriculum in terms of GEC, CC and PEC. With this program, there is an assurance that we are not employing out-of-field teachers in SHS because the new curriculum will tool or prepare the pre-service teachers with the requirements for SHS teaching positions. Finally, the major implication of this paper rests on the importance of examining the alignment with what pre-service teachers are prepared in any teacher education curriculum and what TPACK requirements are needed in the teaching profession not only here in the Philippines but across the world because we may be sharing the same curricular challenges and issues. Any curriculum should be responsive or coherent to the needs of the society which it is designed to serve.

References

- Acosta, I., & Acosta, A. (2016). Teachers' perceptions on senior high school readiness of higher education institutions in the Philippines. *Universal Journal of Educational Research*, 4(10), 2435-2450.
- Baran, E., Chuang, H. H., & Thompson, A. (2011). TPACK: An emerging research and development tool for teacher educators. *TOJET: The Turkish Online Journal of Educational Technology*, 10(4), 370-377.
- Commission on Higher Education. (2017). *Policies, standards and guidelines for bachelor of secondary education (BSEd)*. Retrived form <http://ched.gov.ph>
- Corbin, J. & Strauss, A. (2008). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (3rd ed.). Thousand Oaks, CA: Sage.
- Department of Education. (2015). *Suggested Academic Track - Science, Technology, Engineering, and Mathematics Strand Scheduling of Subjects*. Retrived form www.deped.gov.ph
- Department of Education. (2017). *National adoption and implementation of the philippine professional standards for teachers*. Retrived form www.deped.gov.ph
- Department of Education. (2018). *Hiring guidelines for senior high school teaching positions effective school year (SY) 2016-2017*. Retrived form www.deped.gov.ph
- Febro, R. D., & Buan, A. T. (2013). Development of educational technology courses and their application in student teaching: case of Mindanao State University – Iligan Institute of Technology (Philippines). *Case Studies on Integrating ICT into Teacher Education Curriculum in Asia*, 40-53.
- Goldspink, C., Winter, P., & Foster, M. (n.d.). *Student engagement and quality pedagogy*. Retrived form https://www.education.sa.gov.au/sites/g/files/net691/f/student_engagement_and_quality_pedagogy.pdf
- Guerriero, S. (n.d.). *Teachers' pedagogical knowledge and the teaching profession*. OECD.
- Helyer, R., & Lee, D. (2014). The role of work experience in the future employability of higher education graduates. *Higher Education Quarterly*, 68(3), 348-372. <https://doi.org/10.1111/hequ.12055>

- Hemmerich, A. L., Hoepner, J. K., & Samelson, V. M. (2015). Instructional internships: Improving the teaching and learning experience for students, interns, and faculty. *Journal of the Scholarship of Teaching and Learning*, 15(3), 104-132.
- Hernando-Malipot, M. (2017). Insufficient supply of qualified teachers remains DepEd's challenge. *Manila Bulletin*. Retrived form <https://news.mb.com.ph/2017/06/08/insufficient-supply-of-qualified-teachers-remains-depeds-challenge/>
- Ingersoll, R. M. (2002). *Measuring out-of-field teaching*. Philadelphia, PA: University of Pennsylvania.
- Jean, C. P., Kawai, H., Rong, H. W., Chi, O. X., & Yin, S. C. (2012). *Internship satisfaction: A preliminary study on undergraduates from Faculty of Business and Finance of University Tunku Abdul Rahman*. Universiti Tunku Abdul Rahman.
- Kärkkäinen, K., & S. Vincent-Lancrin. (2013). Sparking innovation in STEM Education with Technology and Collaboration: A Case Study of the HP Catalyst Initiative. *OECD Education Working Papers*, No. 91. Retrieved from <http://dx.doi.org/10.1787/5k480sj9k442-en>
- Klopfer, E., Osterweil, S., Groff, J., & Haas, J. (2009). The instructional power of digital games, social networking, simulations and how teachers can leverage them. *The Education Arcade - Massachusetts Institute of Technology*, 1-23.
- Koehler, M. J., & Mishra, P. (2008). Introducing TPACK. In *AACTE Committee on Innovation & Technology* (Eds.), *Handbook of technological pedagogical content knowledge for educators* (pp. 3–29). New York, NY: Routledge.
- Lucenario, J. L., Yangco, Y. T., Punzalan, A. E., & Espinosa, A. A. (2016). Pedagogical content knowledge-guided lesson study: Effects on teacher competence and students' achievement in chemistry. *Education Research International*, 1-9.
- Martin, B. (2015). Successful implementation of TPACK in teacher preparation programs. *International Journal on Integrating Technology in Education (IJITE)*, 4(1), 17-26.
- Mayes, R., Natividad, G., & Spector, J. M. (2015). Challenges for educational technologists in the 21st century. *Education Sciences*, 5, 221-237.
- McConney, A., & Price, A. (2009). Teaching out-of-field in Western Australia. *Australian Journal of Teacher Education*, 34(6), 86-100.
- Mishra, P., & Koehler, M. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 1017–1054.
- Moreau, M. P., & Leathwood, C. (2006). Graduates' employment and the discourse of employability: A critical analysis. *Journal of Education and Work*, 19(4), 305–324.
- National Council for Teacher Education. (2009). *National Curriculum Framework for Teacher Education*. New Delhi: Document Press, HS-14 Kailash Colony Market, New Delhi-110048.
- O'Leary, S. (2016). Graduates' experiences of, and attitudes towards, the inclusion of employability-related support in undergraduate degree programmes; trends and variations by subject discipline and gender. *Journal of Education and Work*, 1-21.

- Orale, R., & Sarmiento, D. (2016). Senior high school curriculum in the Philippines, USA, and Japan. *Journal of Academic Research*, 1(3), 12-23.
- Patra, G. (2016). Instructional effectiveness in the light of national curriculum frame work. *International Journal of Multidisciplinary Approach and Studies*, 3(5), 46-56.
- Peralta – Ruales, S. T., & Adriano, C. T. (2011). ICT integration in teacher education institutions. *The Mindanao Forum*, 24(2), 151-179.
- Phoebe, W. K. (2010). Determinants of internship effectiveness for university students in Hong Kong. *Hong Kong Baptist University*, 1-57.
- Plessis, E. D. (n.d.) The implications of the out-of-field phenomenon for effective teaching, quality education and school management. Department of Further Teacher Education. University of South Africa, Pretoria, South Africa.
- Sarvi, J., Munger, F., & Pillay, H. (2015). *Transition to K-12 education systems; experiences from five case countries*. Mandaluyong City, Philippines: Asian Development Bank.
- Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2009). Technological pedagogical content knowledge (TPACK): The development and validation of an assessment instrument for preservice teachers. *Journal of Research on Technology in Education*, 4(2), 123–149.
- Sergio, M. R. (2011). K-12 Education reform: Problems and prospects. *Gibon*, 9, 70-80.
- Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4-14.
- Tanak, A. (2018). Designing TPACK-based course for preparing student teachers to teach science with technological pedagogical content knowledge. *Kasetsart Journal of Social Sciences*.
- The Safe, Responsible and Ethical use of ICT*. (2013, September 13). Retrieved April 5, 2018, from holl0143: <https://holl0143.wordpress.com/2013/09/13/the-safe-responsible-and-ethical-use-of-ict/>
- Vegas, E. (2007). Teacher labor markets in developing countries. *Spring*, 17(1), 219-232.
- Wilson, S. M., Shulman, L. S., & Richert, A. E. (1987). “150 different ways” of knowing: *Representations of knowledge in teaching*, In. Calderhead, J. (Ed.), *Exploring teachers’ thinking* (pp. 104-124). London, England: Cassell.
- Wu, Y. T., & Anderson, O. R. (2015). Technology-enhanced stem (science, technology, engineering, and mathematics) education. *Journal of Computer Education*, 2(3), 245-249.