# FORMULATION OF UNDERGRADUATE TEACHER EDUCATION CORE COMPETENCIES: A HARMONIZATION APPROACH

**Michael B. Cahapay**

*College of Education, Mindanao State University, General Santos City, Philippines*
*mbcahapay@up.edu.ph*

---

## Abstract

*The expectations for teacher education can sometimes be diverging, which can be addressed through a harmonization approach. This paper is a preliminary analysis that aims to formulate a set of competencies for teacher education by harmonizing different curriculum sources. Using document analysis as a research method, the Association of Southeast Asian Nations (ASEAN) teachers competency framework, Commission on Higher Education (CHED) program outcomes, and Department of Education (DepEd) professional standards for teachers were examined. The results showed unique, common, and different teacher expectations. Based on this result, seven core competencies were proposed underscoring content knowledge, learner diversity, learning environment, educational foundations, instructional development, community linkages, and personal and professional development. As part of the initial stage in the rigorous process of curriculum development, the results of this work should further undergo validation in the future.*

### Keywords

Teacher Education, Core Competencies, Harmonization Approach, Curriculum Development

---

# 1. Introduction

Higher education institutions continually face different issues to be relevant, appropriate, and responsive in the 21st century. Saltman and Means (2018) expressed that higher education institutions today are anticipated to align with the emerging needs of society locally and globally. Thus, the undergraduate education students should be offered opportunities to multidisciplinary learning experiences which will prepare them when the needs of the field change. This is besides another issue that there are many teacher education theories with a considerably diverse emphasis on knowledge bases (e.g. see Shulman, 1986; Grossman, 1990).

Teacher education institutions in the Philippines are supervised by the CHED that sets the minimum outcomes required. On the other hand, the DepEd prescribes standards for the practice of the teaching profession in the field. It is assumed that these outcomes and standards complement each other but there has been no explicit effort to review this issue. Furthermore, with recent ASEAN integration, there is a need to align teacher education competencies to the ASEAN Teachers Competency Framework. These three curriculum sources form the essential expectations for a teacher education curriculum to be relevant, appropriate, and responsive. However, there is a need to harmonize these expectations.

Harmonization in higher education, in terms of extent, is a process ranging from broad such as regional education cooperation involving countries to narrow like university education initiatives in one country. On the other hand, the elements of harmonization can also range from policies, structures, and courses to competencies, skills, and topics (Brandt & Arnberg, 2007; Zachariah, 2011; Ngalim, 2014; Meyer & de Jesus 2015; Cvijetić, Savičević, & Mijailović, 2018; Tennant & Karuku, 2016; Mandić, 2018; van der Aa, Scheele, Goverde, & Teunissen, 2019). This current paper is similar to the study of Yang and Chou (2020) on the formulation of competencies, but it differs in the use of harmonization as an approach to integrate competencies.

The successful development of competencies drawn from different curriculum sources such as international frameworks, regulatory bodies, industry needs, and relevant theories, has been reported in several studies in many higher education programs (Whitcom, Khan, & White, 2014; Taha, 2015; Leslie, 2016; Ahmadi, Yazdani, Mohammad-Pour, 2017; Sabin, Alrumaih, & Impagliazzo, 2018; Batt, Tavares, & Williams, 2019; Ludwikowska, 2019). Using varied methods, some principles of harmonization have been implicitly used in these studies. It is interesting in the

present paper how harmonization will occur considering a broader demand from an international framework and the requirements of national professional bodies.

This study is significant in higher education studies as a whole and in teacher education studies. It will provide knowledge on how competencies can be formulated through the harmonization of different local and global frameworks. It will practically assist higher education professionals who assume curriculum development tasks in their respective fields. This paper will also offer baseline information about emerging teacher education competencies. It will help teacher education institutions in the development of their curriculum programs.

Thus, this paper aimed to develop a set of competencies for undergraduate teacher education by harmonizing the relevant curriculum sources. Specifically, it answered the following questions:

1. What expectations are common, subsumed, and unique when the three curriculum sources are placed in a comparative analysis?

2. What set of competencies for undergraduate teacher education can be formulated by harmonizing the three curriculum sources?

## 2. Literature Review

This section presents the review of related works that significantly shaped this current paper. It discusses the teacher education theories and curriculum harmonization approach.

### 2.1 Teacher Education Theories

Teacher education has a set of the knowledge base that distinguishes it from other professions. A vast body of studies in education has aimed at developing a teacher knowledge base and, where possible, interpreting them into inputs for undergraduate teacher education (Reynolds, 1989). However, no agreement has been reached about such a teacher knowledge base.

There seemed to be two seminal frameworks of the knowledge base of teaching identified in most pieces of literature: Shulman (1986) and Grossman (1990). These frameworks operate in almost similar categories. This is not surprising because one pioneered the work which was later refined by the other. The use of the terms as categories and components in the respective frameworks reflect the perspectives they applied.

Shulman (1986) was the first to propose categories of teacher knowledge base to promote understanding of the profession, making him the pioneer in the field of research on the teacher knowledge base. After his initial proposal, he continuously worked until he finally outlined seven

types of basic knowledge that teachers must possess: "content knowledge; general pedagogical knowledge; curricular knowledge; pedagogical content knowledge; knowledge of learners and their characteristics; knowledge of educational contexts; and knowledge of outcomes" (pp 9-10). Many later kinds of research have been conducted on some categories while others have either narrowly or not been formally explored.

Following this pioneering work on the teacher knowledge base, Grossman (1990) made an important contribution to further understanding of this framework. He systematized the components of the teacher knowledge base by drawing the interrelationships of the categories, which could be the reason for the term components rather than categories. He suggested four interrelating components that constitute the teacher knowledge: "general pedagogical knowledge; subject matter knowledge; pedagogical content knowledge; knowledge of context" (pp. 379-382). Each of the components in this framework also embodies other areas of the knowledge base under it.

These general conceptualizations of a teacher's knowledge base have been adopted or even revised to evolve further in specialized teacher education programs. This review identifies at least two teacher knowledge base frameworks found per field of specialized teacher education programs representing some different periods or decades each. These frameworks were designed for language teacher education (Day, 1993; Jesse, 2018); mathematics teacher education (Marks, 1990; Scheiner, 2015); and science teacher education (Carlsen, 1999; Park & Oliver, 2008).

Considering the teacher knowledge base frameworks reviewed, several trends can be identified in past and present practices. Although the frameworks both the general and specialized differ in detail, many of them converge in efforts to further extend and cultivate the construct of the teacher knowledge base. Although it can be assumed that most of the later frameworks were generated based on the seminal frameworks of Shulman (1987) and Grossman (1990), the similarity of the components across specialized teacher education proves that there exists a common or universal knowledge base for teachers regardless of their disciplines.

Furthermore, there are unique categories not found in previous frameworks worthy of attention. These are support knowledge (Day, 1993); knowledge of learning (Scheiner, 2015); disciplinary knowledge, knowledge of learning, and knowledge of teacher cognition (Jesse, 2018). However, after analysis of these components with other components in other frameworks, the researcher found out that each component is covered in broader components. For example, the knowledge of learning both considered by Scheiner (2015) and Jesse (2018) can be subsumed in the

knowledge of learners. Shulman (1987) defined knowledge of learners to broadly include knowledge of learning.

## 2.2 Curriculum Harmonization Approach

The term "harmonization" has been employed in different situations to explain the same concepts such as coherence, cooperation, alignment, partnership, integration, collaboration, and partnership (Knight, 2012). However, harmonization, as applied to education, is not equal to standardization, regulation, uniformity, homogenization, or condensation of all higher education institutions. Rather, it refers to the synchronization of educational programs with arrangements to minimum standards and ensuring similarity and comparability of elements between and among countries involved (Woldegiorgis, 2013).

Thus, harmonization can be assumed as a manner of ensuring articulation between programs and institutions between or among different higher education systems. It is the practice of instituting yardsticks for program providers and accreditations. It may include synchronizing credit systems, quality management, regulation, and acknowledgment of the diplomas. The general purpose of it is to facilitate comparability, equivalence, and employability across regions, countries, or institutions. Hence, for obvious reasons, harmonization is being strived in education to enhance the excellence of education and improve the mobility of students, teachers, administrators, and researchers (Forcier, Simoens, & Giuffrida, 2004; Garcia-Perez, Amaya, & Otero, 2007; Hoosen Butcher, Khamati, & Njenga, 2009; Woldegiorgis, 2013; Meyer & de Jesus, 2015)

However, tensions between standardization and contextualization may appear in the process of harmonizing a curriculum, which may pose a challenge in the process because harmonization is intended to provide benchmarks while acknowledging local independence. Van der Aa et al. (2019) found out that pressures in the process of harmonizing a curriculum were ostensible in two domains: changing ideas about the meaning of harmonized curriculum for the current curriculum and discrepancies between educational doctrines and the actuality of teaching. Nonetheless, they identified ways of resolving these pressures, which were depicted as negotiating flexibility.

Harmonization of curriculum programs has been performed in different higher education contexts with different scopes and elements. For example, Meyer and de Jesus (2015) proposed a veterinary medicine curriculum harmonization framework for Latin American countries. Harmonizing data gathered from a broad desk review and knowledge extracted from discussions with veterinarians from Argentina, Bolivia, Chile, Colombia, Costa Rica, Guatemala, Mexico, and

Peru, the paper proposed a core curriculum for veterinary medicine education. The element that was focused on in this study is the process skills required for the veterinary professions.

Furthermore, Tennant and Karuku (2016) studied curriculum harmonization in four countries of Kenya, Rwanda, Tanzania, and Uganda by comparing the national secondary school mathematics instructional plans. One of the elements of the curriculum harmonization process is the sequencing topics. On the other hand, Castells, Lapa, de Osés, & Nikolić (2016) proposed research that aimed to harmonize the maritime curriculum in the two countries of Montenegro and Albania with reference to a continental standards framework. The elements considered for harmonization were the course and units required for the curriculum.

Similarly, Cvijetić et al. (2018) reported a process of harmonization of the curriculum within the scope of the preschool teacher education curriculum in Serbia in partnership with higher education institutions from the United Kingdom, Slovenia, and Hungary. The authors of this paper presented the results of the harmonization of the preschool teacher education curriculum based on a comparative analysis of the different elements such as existing study programs, focusing on the outcomes and competencies of the graduates.

On the other hand, the study of Mandić (2018) was more specific both in scope and elements. It specifically attempted to harmonize a chosen informatics teacher curriculum from Serbia and the reference informatics teachers' curriculum model. Using a software platform, he compared the two informatics teacher education curriculum programs. The common elements between the two curriculum programs that were subjected to the analysis included competencies. The competencies were further divided into skills and content.

The review of related literature guided the current inquiry. Based on the analysis, there are different knowledge base theories on what competencies should constitute a teacher education curriculum. Furthermore, harmonization provided an approach to address the wide possibility of identifying core competencies for teacher education. As an approach, it has been used to cover a narrower scope such as one educational institution and a more defined curriculum element such as competencies.

## 3. Methods

This section presents the methods employed in this study. It covers the research design, unit of analysis, search procedure, and data analysis.

### 3.1 Research Design

This work generally employed a qualitative research design. Creswell (2013) noted that qualitative research designs typically aid in researching topics where little is known about a phenomenon. This suggests that qualitative research is less focused on testing hypotheses, but the description, analysis, and interpretation of a given unexplored phenomenon. The present research has the main purpose to formulate a set of core competencies for teacher education through the harmonization of various curriculum sources. This purpose does not test a proposition but attempts to examine an interest that is relatively unexplored in the current context. Given this nature, a qualitative research design is considered appropriate.

### 3.2 Unit of Analysis

The unit of analysis of this study is documents. The documents, as a record of human activities, provide a valuable data source for analysis in this study. The data of this paper specifically came from a type of document called public records, defined as official, ongoing records (Mills et al., 2010). Furthermore, this type of document can also be considered as primary sources being original documents (Guptill, 2016). The documents examined as units in this study were selected based on the following inclusion standards: written in intelligible language, accessible in full text, authored by credible persons or institutions, focused on the teacher education. They are shown in Table 1 with their titles, publication details, and relevant descriptions.

**Table 1:** *Documents Used for this Study*

| Title of Document | Publication | Relevant Description |
|---|---|---|
| Southeast Asia Teachers Competency Framework | Thailand, 2018 | It is a set of skills, knowledge, behaviors, and attributes which the ASEAN ministries of education have agreed that teachers in their respective countries need to possess. |
| CHED Memorandum Order No. 74 | Philippines, 2017 | It articulates minimum requirements in terms of common program outcomes for all higher education institutions offering undergraduate teacher education program in the Philippines. |
| Department of Education Order No. 42 | Philippines, 2017 | It is used as the basis for all teacher development programs in the country to ensure that teachers are equipped to implement the K to 12 Program. |

### 3.3 Search Procedure

Following the steps recommended by Armstrong et al. (2011), the procedure adopted for this

paper observed these following: search of documents from online sources; assessment of the gathered documents based on the standards established; analysis of the documents found to be relevant; and synthesis of the results. The in this paper researcher specifically navigated the online library using the Google search engine to look for the target documents. The next step employed was the assessment of the documents found. The content of the documents was carefully examined based on their relevance to the study. The documents that qualified were then considered for analysis.

## 3.4 Data Analysis

Document analysis was mainly applied to carefully examine the emerging assessment practices in the context. Document analysis is a form of qualitative research technique in which documents are analyzed by the researcher to give meaning around a topic. It incorporates the coding of content into themes the same way interview transcripts are analyzed (Bowen, 2009). Specifically, a task analysis technique was also used to formulate the core competencies for teacher education. This technique is further framed in the upper level of the taxonomy of the cognitive domain by Bloom (1956), higher enough for competence. This taxonomy also provided for a language that is observable, measurable, attainable. It should be further noted that the core competencies were formulated within the undergraduate teacher education context.

# 4. Results

The curriculum sources considered this study are the ASEAN Teachers Competency Framework, CHED Program Outcomes Common to Teacher Education, and DepEd Professional Standards for Teachers.

## 4.1 Comparative Analysis

The expectations articulated by these three main curriculum sources for teacher education are studied through comparative analysis. The results are shown in Table 2.

**Table 2** *Comparative Analysis of Teacher Education Expectations*

| ASEAN Teachers Competency Framework | CHED Program Outcomes Common to Teacher Education | DepEd Professional Standards for Teachers |
|---|---|---|
| 1. Know and Understand What I Teach | 1. Demonstrate mastery of the subject matter | 1. Content Knowledge and Pedagogy |
| | 2. Apply skills in technology | |

| | development | |
|---|---|---|
| | 3. Articulate rootedness of education | |
| 2. Help My Students Learn | 4. Develop instruction for diverse learners | 2. Diversity of Learners |
| | 5. Facilitate teaching methodologies and delivery modes for specific learners and their environment | 3. Learning Environment |
| | | 4. Curriculum and Planning |
| | 6. Demonstrate skills in planning, monitoring, assessing, and reporting | 5. Assessment and Reporting |
| 3. Engage the Community | | 6. Community Linkages and Professional Engagement |
| 4. Become a Better Teacher Everyday | 7. Practice professional and ethical teaching standards | 7. Personal Growth and Professional Development |
| | 8. Pursue lifelong learning for personal and professional growth | |

### 4.1.1 Common

There are common expectations among the three curriculum sources for teacher education. Notably, general content mastery appeared to be evident across the three curriculum sources. It is variously reflected as *know what I teach* as an ASEAN competency, *demonstrate mastery of subject matter* as a CHED outcome, and *content knowledge* as a DepEd standard. The teacher development also seemed observable across the three sources. These are expressed as *become a better teacher every day* as an ASEAN competency, *pursue lifelong learning for personal and professional growth* as a CHED outcome, and *personal growth and professional development* as a DepEd standard. Another expectation that stands out between the two curriculum sources is the extension aspect of teacher education. It is indicated to *engage the community* as an ASEAN competency and *community linkages and professional engagement* as a DepEd standard.

### 4.1.2 Subsumed

Furthermore, there are also instances when a common expectation in one or two curriculum sources subsume various expectations in one curriculum source or the other way. For instance, the *know and understand what I teach* as an ASEAN competency and *content knowledge and pedagogy*

as a DepEd standard cover the various outcomes in CHED. On the other hand, the *help my students learn* as competency in ASEAN broadly encompasses the various CHED outcomes and DepEd standards from the planning phase to the evaluation phase. Though overtly common, the same can be said of the *become a better teacher every day* as an ASEAN competency and *personal growth and professional development* as a DepEd standard that subsume two CHED outcomes related to them.

### 4.1.3 Unique

Though expectations across curriculum sources are either common or subsumed to each other, however, there are also unique expectations that only exist in one source. An example of this is the CHED outcome rootedness of education which outlines the *philosophy, sociology, psychology, history, and politics* of education. When examining the details of DepEd standards and ASEAN competencies, this aspect cannot be overtly found. The DepEd standard *learning environment* which articulates physical and psychological dimensions cannot also be found as an expectation independently emphasized in both the CHED outcomes and ASEAN competencies.

### 4.2 Proposed Competencies

Based on the analysis of common, subsumed, and unique expectations from the three curriculum sources, the following domains, and core competencies can be formulated in the context of undergraduate teacher education:

- Content Knowledge: Synthesize fundamental knowledge that constitutes a subject matter area or discipline needed to deliver instructional content.

- Learner Diversity: Propose an instruction that considers the diversities of learners in terms of culture, ability, language, interest, experience, gender, and other aspects.

- Learning Environment: Generate a plan that ensures both the physical and psychological dimensions of a conducive learning environment for the learners.

- Educational Foundations: Synthesize the major philosophical, sociological, and psychological foundations that underpin the educational processes.

- Instructional Development: Design relevant, appropriate, and responsive instruction that employs sound principles and theories of education.

- Community Linkages: Develop extension activities that address the cultural, social, economic, moral, and educational concerns of the immediate community.

- Personal and Professional Development: Write a career development plan that outlines personal and professional goals.

## 5. Discussion, Conclusion, Recommendation

This research was guided by the issues and needs introduced in the paper. As a preliminary analysis, it aimed to develop a set of competencies for teacher education by harmonizing the relevant curriculum sources. The process of harmonization was mainly converged within the scope of national teacher education and specifically focused on the element of competencies. Cvijetić et al. (2018) documented a harmonization process of the curriculum within the broad scope of partnership initiatives among four countries. The authors presented the results of the harmonization of curriculum based on a comparative analysis of the different elements such as existing study programs, focusing on the outcomes and competencies of the graduates. This kind of comparison was also done by Kurt and Köse (2019) in two countries in the field of vocational and technical education, benchmarking upon their systems, curriculums, and practices. On the other hand, Mandić (2018) was narrower both in scope and elements of harmonization. It specifically attempted to harmonize a chosen informatics teacher curriculum from a country and the reference informatics teachers' curriculum model. Using a software platform, he compared the two informatics teacher education curriculum programs. The common elements between the two curriculum programs that were subjected to the analysis included competencies. The competencies were further divided into skills and content.

Moreover, the process of constant comparative analysis performed in this research is similar to the processes done in studies that aimed to harmonize competencies in a particular higher education field. This study combined a comparative analysis and tabulation method to reveal common expectations, subsumed expectations, and unique expectations. The research of Tennant and Karuku (2016) aimed to harmonize a curriculum in four countries in East Africa. A comparative analysis technique was applied to reveal commonalities as well as the absence of certain topics. It also studied the differences in the sequence of topics in each curriculum, revealing differences in the intended curriculum and implemented curriculum. Similarly, Klongvessa (2011) used a tabulation method to compare the expected learning outcomes articulated in three curriculum sources in a country. His paper uncovered common outcomes addressed across the three curriculum sources,

outcomes that already exist but not explicitly stated, and outcomes that did not exist in one of the curriculum sources.

Lastly, the core competencies uncovered in the results are similar and different in the teacher education knowledge base theories. This result proved that there are universal expectations common to teacher education across place and time. However, there can also be slight variations which should be taken as caused by emphasis rather than difference. The seminal work of Shulman (1986) on the categories of teacher knowledge base outlined seven types of basic knowledge that a teacher must possess: content knowledge; general pedagogical knowledge; curricular knowledge; pedagogical content knowledge; knowledge of learners and their characteristics; knowledge of educational contexts; and knowledge of outcomes. Many later studies (e.g. 1993; Carlsen, 1999; Scheiner, 2015; Jesse, 2018) have been conducted focusing on some categories while others have either subsumed or separated other categories. For example, support knowledge (Day, 1993); knowledge of learning (Scheiner, 2015); disciplinary knowledge, knowledge of learning, and knowledge of teacher cognition (Jesse, 2018) have been proposed. While these categories are not entirely new, it proves the dynamism of teacher education knowledge base across contexts.

The analysis of three curriculum sources showed points of commonalities and differences in the expectations for teacher education. Based on these expectations, a harmonization produced seven core competencies framed in the context of undergraduate teacher education. These are content knowledge, learner diversity, learning environment, educational foundations, instructional development, community linkages, and personal and professional development. This study provides evidence for higher education studies as a whole and teacher education studies. It offers knowledge of how competencies can be formulated through the harmonization of different global and national frameworks. It also gives baseline information about emerging competencies for undergraduate teacher education curriculum. It should be noted that curriculum development is a rigorous process. This work was delimited to the initial stage performed through document analysis by a single researcher. Thus, it is recommended that the results generated should further undergo the validation stage with relevant stakeholders in the field like the experts, professors, industry, and students. Some scholarly works related to the harmonization of competencies in other fields of higher education are also suggested for future research.

# REFERENCES

Ahmadi, S., Yazdani, S., & Mohammad-Pour, Y. (2017). Development of a nursing competency framework: Thematic content analysis. *International Journal of Scientific Study, 5*(4), 827-831. Retrieved from https://www.ijss-sn.com/uploads/

Batt, A. M., Tavares, W., & Williams, B. (2019). The development of competency frameworks in healthcare professions: a scoping review. *Advances in Health Sciences Education.* https://doi.org/10.1101/19003475

Bloom, B. S. (1956) *Taxonomy of educational objectives: Cognitive domain.* New York:  David McKay.

Brandt, S. A., & Arnberg, W. (2007). A harmonized GIS course curriculum for Swedish universities. In *Proceedings of ESRI European User Conference* 2007 (pp 1-10). Stockholm, Sweden: ESRI.

Bowen, G. A. 2009, Document analysis as a qualitative research method. *Qualitative Research Journal, 9*(2), 27-40. https://doi.org/10.3316/QRJ0902027

Carlsen W. S. (1999) Domains of teacher knowledge. In J. Gess-Newsome, & N. G. Lederman (Eds.), *Examining pedagogical content knowledge: The construct and its implications for science education* (pp. 133-144). Dordrecht, the Netherlands: Kluwer Academic Publishers. https://doi.org/10.1007/0-306-47217-1_5

Castells, M., Lapa, K., de Osés, F. X. M., & Nikolić, D. (2016). A proposal to modernize and harmonize maritime curricula in Montenegro and Albania. *Naše More, 64*(1), 14-19. https://doi.org/10.17818/NM/2017/1.3

Creswell, J. W. (2013). *Qualitative inquiry & research design choosing among five approaches* (3rd ed.). Thousand Oaks, CA: SAGE.

Cvijetić, M., Savičević, D., & Mijailović, G. (2018, June). Harmonization of preschool teacher education curriculum at Preschool Teacher Training and Business Informatics College of Applied Studies–Sirmium. In *Proceedings of International Conference on the Future of Education*. Florence, Italy: Libreria Universitaria.

Day, R. (1993). Models and the knowledge base of second language teacher education. *University of Hawaii's Working Papers in ESL, 11*(2), 1-13. Retrieved from https://core.ac.uk/download/

Forcier, M. B., Simoens, S., & Giuffrida, A. (2004). Impact, regulation, and health policy implications of physician migration in OECD countries. *Human Resource Health, 2*(1):12. https://doi.org/10.1186/1478-4491-2-12

Garcia-Perez, M. A., Amaya, C., & Otero, A. (2007). Physicians' migration in Europe: an overview of the current situation. *BMC Health Services Research, 7*(1):201. https://doi.org/10.1186/1472-6963-7-201

Grossman, P. (1990) *The making of a teacher: teacher knowledge and teacher education.* New York: Teachers College Press. https://doi.org/10.1177/002248719104200507

Guptill, A. (2016). Secondary sources in their natural habitats. *Writing in College.* Retrieved from https://milnepublishing.geneseo.edu/

Hoosen, S., Butcher, N., Khamati, B., & Njenga. (2009). Harmonization of higher education programmes: A strategy for the African Union. *African Integration Review, 3*(1).

Jesse, N. W. (2018). The knowledge base of language teacher education in Kenya. *International Organization of Scientific Research Journal of Mathematics, 14*(2), 01-09. Retrieved from http://www.iosrjournals.org/iosr-jm/papers/

Klongvessa, N. (2011, March). *Outcome-based curriculum and alteration in landscape architecture lesson plan.* Paper presented at IFLA APR Symposium on Landscape Architecture Education, Putra, Malaysia. Retrieved from http://www.land.arch.chula.ac.th/eng/

Knight, J. (2012, September 15). A Conceptual framework for the regionalization of higher education: Application to Asia. *East-West Center Collaboration Expertise Leadership,* 17-35. https://doi.org/10.1057/9781137311801_2

Kurt, A., & Köse, E., (2019). Comparing Vocational and Technical Education System of Turkey and Germany. *PEOPLE: International Journal of Social Sciences, 5*(2), 959-974. https://doi.org/10.20319/pijss.2019.52.959974

Leslie, C. (2016, June). Engineering competency model. In *ASEE's 123rd Annual Conference & Exposition.* New Orleans, LA: American Society for Engineering Education.

Ludwikowska, K. (2019). Teacher competence inventory: An empirical study on future-oriented competencies of the teaching profession in higher education in India. *Education + Training, 61*(9), 1123-1137. https://doi.org/10.1108/ET-12-2018-0266

Mandić. M. (2018, June). Semantic web-based software platform for curriculum harmonization. In *Proceedings of 8th International Conference on Web Intelligence, Mining and Semantics* (pp

1-9). Novi Sad, Serbia: Association for Computing Machinery. https://doi.org/10.1145/3227609.3227654

Marks, R. (1990). Pedagogical content knowledge: From a mathematical case to a modified conception. *Journal of Teacher Education, 41*(3), 3-11. https://doi.org/10.1177/002248719004100302

Meyer, O. & de Jesus, B. (2015). *A proposed framework for harmonization of the veterinary medicine curriculum in Latin America* (M.A. thesis) Retrieved from http://hdl.handle.net/

Mills, A. J., Durepos, G., & Wiebe, E. (2010). *Encyclopedia of case study research.* Thousand Oaks, CA: SAGE. https://doi.org/10.4135/9781412957397

Ngalim, V. B. (2014). Harmonization of the educational sub-systems of Cameroon: A multicultural perspective for democratic education. *Creative Education, 5*(5), 334-346. https://doi.org/10.4236/ce.2014.55043

Park, S., & Oliver, S. (2008). Revisiting the conceptualization of pedagogical content knowledge (PCK): PCK as a conceptual tool to understand teachers as professionals. *Research in Science Education, 38*(3), 261-284. https://doi.org/10.1007/s11165-007-9049-6

Sabin, M. C., Alrumaih, H., & Impagliazzo, J. (2018). A competency-based approach toward curricular guidelines for information technology education. In *2018 IEEE Global Engineering Education Conference.* Santa Cruz de Tenerife, Spain: IEEE Xplore. https://doi.org/10.1109/EDUCON.2018.8363368

Saltman, K. J., & Means, A. J. (2018). *The Wiley handbook of global educational reform.* New Jersey: John Wiley & Sons. https://doi.org/10.1002/9781119082316

Scheiner, T. (2015). Shifting the emphasis toward a structural description of (mathematics) teachers' knowledge. In K. Bewick, T. Muir, & J. Wells (Eds.), *Proceedings of the 39th Conference of the International Group for the Psychology of Mathematics Education* (pp. 129-136). Hobart, Australia: PME.

Shulman, L. S. (1986). Those who understand: A Conception of teacher knowledge. *Educational Researcher, 15*(2), 4-14. https://doi.org/10.3102/0013189X015002004

Taha, W. S. (2015). A guide to developing a competency-based curriculum for a residency training program: Orthopaedic perspective. *Journal of Taibah University Medical Sciences, 10*(1), 109-115. https://doi.org/10.1016/j.jtumed.2015.02.004

Tennant, G., & Karuku, S. (2016). Towards a harmonized curriculum in East Africa: A comparative perspective of the intended secondary school mathematics curriculum in Kenya, Rwanda, Tanzania and Uganda. *Mathematics education in East Africa: Towards harmonization and enhancement of education quality*, 9-25 https://doi.org/10.1007/978-3-319-27258-0_2

Van der Aa, J. E., Scheele, F., Goverde, A. J., & Teunissen, P. W. (2019). A qualitative study on harmonization of postgraduate medical education in Europe: Negotiating flexibility is key. *Perspectives on Medical Education, 8*(4), 216-222. https://doi.org/10.1007/s40037-019-0523-4

Whitcom, C., Khan, R., & White, C. (2014). *Development of a system engineering competency career development model: An analytical approach using Bloom's taxonomy* (Report no. FY2013). Monterey, CA: Naval Postgraduate School. https://doi.org/10.21236/ADA608033

Woldegiorgis, E. T. (2013). Conceptualizing harmonization of higher education systems: The application of regional integration theories on higher education studies. *Higher Education Studies, 3*(2), 12-23. https://doi.org/10.5539/hes.v3n2p12

Yang, C. H., & Chou, J. T., (2020). Exploring the Competency of Ground Service Staff: The Application of Interdisciplinary Education in College via the DACUM Analysis Method. *PEOPLE: International Journal of Social Sciences, 6*(2), 310-327. https://doi.org/10.20319/pijss.2020.62.310327

Zachariah, N. (2011, August 10). Curriculum harmonization in EAC is a big challenge. *Times Reporter*. Retrieved from https://www.newtimes.co.rw/section/