



Competence and Excellence in Vocational Education and Training

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Abstract

The notion of competence continues to be a major theme of vocational research. Notions of key competencies, in particular, continue to evolve in response to arguments about the new learning requirements of work and citizenship in the twenty-first century, including the rise of an interest in cross-cultural competencies. Yet there is still much controversy over the definition of the most important competencies and over their means of acquisition and assessment. There are questions, too, about how competence needs are identified and addressed in workplaces. Indeed, there are also powerful philosophical divisions among those who advocate competencies as a core aspect of learning systems. Debates about competence have thrown up a range of alternative and additional concepts. There are concerns that competence is best suited to describing a floor of minimally acceptable ability to perform, which is appropriate for assessing basic fitness to practice, particularly for those exiting initial vocational learning. However, where the emphasis is on innovation, artistry, or mastery, then it may be

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that some further notion of excellence is required. However, such concepts often include stronger elements of tacit knowledge and more of a sense of subjective quality, making their measurement and assessment more challenging. There is little need to further define and discuss the issue of competence and competence development. However, the interface of *competence* and *excellence* needs further exploration. This chapter explores relevant research that has addressed the concept of competence and excellence and posits ways in which both can be achieved in vocational education and training.

Keywords

Competence and excellence · Vocational excellence · Global competence · Work readiness

Competence Versus Excellence

Several authors have reviewed and discussed research regarding the possible conundrum of competence versus excellence. Evers and van der Heijden (2017) presented views of the divergent meanings of expertise regarding competence development. Hager (2017) identified a supposed limitation of competence standards, indicating that standards may discourage excellence by means of prescribing minimum standards in assessing competence. He further summarized current thinking by indicating competence-based assessment can, indeed, address a full range of expertise, from excellence to failure.

Mulder and Winterton (2017) purported that competence goes well beyond a minimum of performance. Competence does not necessarily prescribe a minimum; instead, competence depends on how high the standard is set, adding to Hager's (2017) viewpoint that there are gradations of competence assessment. But excellence does not mean "brilliance"; competence does infer additional opportunity to develop to a higher level.

Work at the US Military Academy at West Point was intended to move instruction to higher levels of trainee accomplishment by implementing four basic principles (Smith 2010). Programs and instructors must have high expectations for high levels of success, indicating that students should be expected to achieve excellence beyond skill attainment. Such an endeavor, the report continues, includes expanded opportunities for students to learn, focusing on significant outcomes and designing curricula based on proposed outcomes. Smith concluded that the outcome-based training programs should serve as a model at the university level or in any institution that requires students to excel in more than academics.

Vocational education and training standards in Lithuania, as discussed by Tütlys and Aarna (2017), include two factors: minimal performance requirements as well as the lack of attention to future needs in skill development. Further, they posited that the standards were lacking excellence indicators for the highest quality of performance.

Bowden (1997) drew upon earlier work by Gonczi, Hager, and Oliver in describing levels of competence-based education. Although his work concentrated on the state of affairs in Australia, there is probably ample evidence that the dilemma is not unique to the commonwealth. Bowden asserted that addressing issues in competence-based education must proceed from two points: that the quality of student learning is central to any argument and that the competency movement and the nature of higher education have developed over time. He further indicated the unfortunate situation regarding the disconnect between vocational competence excellence and the need to prescribe work performance that a competence-based approach is appropriate for technical training but not university education and that competence development is regulated to a certain group of students.

Bowden purported that while there are differences among countries and across time spans, the basic principles have remained: a focus on outcomes, greater workplace relevance, observable outcomes, assessments of competence and excellence, and skills recognition. Specifically, the focus on observable outcomes (competence) demands setting of goals, monitoring progress, and achievement recognition. In reviewing the four-level hierarchy of competence development, Bowden described the important trends: increasing the complexity of outcomes (competence), broader curriculum requirements, more complex assessment requirements, an increasing ambiguity between objective and outcome assessments, and an increasing need for professional judgment in assessment.

Mulder (2017a) purported from a synthesis of competence theory and research that competence mastery is not limited by standards, but that competence can be mastered at various levels including excellence and brilliance. Competence is key to effective performance. An important aspect of determining the competence that individuals need is not just for the present but also to address future challenges globally. Barrick (2017), in a review of competence-based education in the United States, also described the relationship between competence assessment and skill mastery. Further research related to vocational excellence (Nokelainen et al. 2017) also identifies self-regulation as a central concept in competence development. Goal orientation, for example, is stronger among employees who exhibit excellence. And finally, Harteis (2017) summarized characteristics of excellence in three terms: comprehensive knowledge, routine, and intuition.

When considering how effective competence-based degree programs can be implemented, Klein-Collins (2012) emphasized the need for strong leadership, rethinking staff and courses, establishing alternative degree pathways, and developing a system of reliable assessments. She concluded that assessment is vital for achieving excellence in quality and value of competence-based programs and that guidelines to assure high quality and rigor are essential.

In a model discussed by Soares (2012, June), the author described the progression of assessment in a learning model that culminates beyond the acquisition of competence; learners must be able to successfully demonstrate performance through assessment and achieving excellence. The model includes four levels of conceptual learning, beginning with traits and characteristics of the learner that serve as the foundation of their learning; they dictate the learning experiences that ensure the

acquisition and development of skills, abilities, and knowledge. Through integrated learning experiences, competence is attained, leading to the ability to demonstrate competence and assessment of performance. While some form of assessment is included at each level, the determination of overall excellence is provided through a summative assessment approach. The question remains, then, how vocational competence development can and should lead toward excellence.

Competence-Based Vocational Education and Training

In a Canadian study, Bell and Mitchell (2000) investigated perceptions of students enrolled in a pre-apprenticeship program. In comparing student perceptions between those in a 36-week traditional cohort group and those in a 1-year competency-based group, the researchers reported differing experiences of the content. Students in the traditional group distinctly perceived a split between theory and practice, while the competency-based group did not. Further, students in the competency-based group were less adversely affected by described academic history and literacy difficulties. The researchers concluded that the competency-based approach to technical education provided advantages in terms of technical competence, learning, and theory/practice integration. As a sidelight, the researchers also discussed the competency-based approach advantages in social development and administrative issues such as scheduling, space allocation, and evaluating student progress.

Mulder presented a comprehensive summary of foundational research on competence-based vocational education and training. Mulder's work (2017b) stems from a thorough review of the comprehensive 2017 text, *Competence-based Vocational and Professional Education: Bridging the Worlds of Work and Education*, on competence-based vocational and professional education. The concept of competence-based education continues to spread, from industry to all levels of formal education. Mulder notes, however, that assessing student competence is getting more attention than supporting student learning. Certainly, assessment is needed, but the question arises whether and how competence-based frameworks for curricula lead to and promote authentic student learning. In some arenas, skills development and assessment have supplanted competence development, leading to teaching skills rather than developing competence.

In higher education, the issue of competence and excellence versus course and degree completion is gaining new attention. Oudshoorn-Fuller et al. (2016) synthesized a number of studies that addressed teaching approaches that should lead to increased student competence. They indicated that utilizing community-building activities, enhancing academic competence, and offering freedom to advanced students appear to be plausible while retaining structure and setting explicit learning objectives for the learners. The researchers also concluded that promoting the connection between the professional field and educators will result in curricular changes to further guide student development, improving the connection between education and practice, and allowing students to develop and enhance competence and behaviors that are essential in their chosen profession. In summary, excellence in

competence development hinges upon the expectations of the profession; educators by themselves may not advance excellence while encouraging competence development among their students.

Rein (2016) provided an overview of competence orientation and development in higher education. As with the Oudshoorn-Fuller et al. study, Rein focused on the juncture of theoretical, instrumental, and practical approaches on education competence and excellence. A main theme of the research centered on the potential interface of higher education and vocational education and training. He surmised that this interface would promote the connections between qualifications in competence excellence and transferring skills and learning outcomes in both academic and nonacademic settings. The driving force, as is apparent in most competence studies, is the increasing requirements of industry and the labor market, since few if any education programs are designed to nurture and develop academic and professional competence. A holistic approach is central to solving complex problems within and beyond academia. Excellence is more than excelling in academic pursuits. Current pedagogical and assessment approaches will need to address academic and professional excellence.

In a study of competence-based vocational education (CBVE) in Ethiopia, Solomon et al. (2016), the authors, concluded that CBVE is practiced in the training and vocational education system in that country but not performing well within that dimension. The system reportedly lacks a practice-oriented learning environment which is essential to competence development and therefore vocational excellence. The challenge is based on the lack of resources and an underdeveloped industrial base within the country. A strong correlation between education and training and graduate job performance was noted as well as a positive correlation between organizational and social conditions and performance. As these issues are addressed, excellence in job performance will emanate from excellence in competence-based programming.

Vocational Excellence

Klotz et al. (2014) conducted a study that was aimed at promoting workforce excellence, concentrating on vocational identity in vocational educational training. They posited that vocational training includes more than factual knowledge and procedures, indicating that vocational identity is a key outcome of vocational education that is integral in how students learn and perform. In their work, the researchers developed a theoretical model to show that practical training, workplace integration, and free career choice lead to workplace and vocational identity which, in turn, lead to workplace effort and vocational competence. Practical training is enhanced through training that is school based as well as industry based; integration involves students as apprentices in actual workplace operations; and a vocation implies a “calling” to the occupation where the student has a choice in careers. The study involved students in vocational and apprenticeship programs in Germany providing perceptions of identity and effort. Generally, the key factors in the

theoretical model were related, indicating that indeed the program characteristics, identity factors, and performance worked in harmony. They concluded that vocational identity is a crucial factor for the development of excellence in the workforce.

The Commission for Adult Vocational Training and Learning (2012) in the United Kingdom can best be summarized by the statement that excellence starts with the teacher. However, they also concluded that there is not a single recommended pathway that results in having world-leading vocational education and training for adults. The researchers identify several characteristics of a positive further education system for excellence in vocational education. Among those characteristics were the following: national policies for teacher qualification, a culture of professionalism with professional organizations supporting excellence, strategic leadership, employer engagement and employer opportunities for teachers to improve, up-to-date resources, teachers serving as positive role models and as experts in their fields, and ambitious learners who are attracted to excellence teachers. An overall premise of the report is that vocational teaching must be an attractive career choice, leading to highly qualified teachers who promote excellence.

Researchers have examined competence- and competence-based education in a variety of settings. While a common understanding may not exist, the basic tenets as described by Suvedi and Ghimire (2018) indicate that vocational educators agree there is a profound need for clearer understandings of those tenets. They argued that excellence is performing at the maximum expected level; excellence provides the highest satisfaction to the individual learner. The authors identified a series of attributes that may be associated generally with excellence in education and particularly in vocational education and training, including such areas as a high level of skill development (both technical and “soft” skills), problem-solving and decision-making, transfer of learning, and persistence and perseverance. Those attributes naturally lead to a series of identified benefits associated with excellence in competence-based vocational education. Such concepts as technical skill (the fundamental purpose of vocational education and training) and non-technical skill development are coupled with more personal attributes such as communication, creativity, confidence, and time management and serve as benchmarks in determining the level of excellence attributed to competence development. Finally, they identify the role of educational institutions in ensuring that vocational education and training programs strive to achieve excellence in and for their students.

Given, then, that a set of attributes of vocational excellence can be defined and described, Relly and Keep (2018) examine approaches to achieving and recognizing vocational excellence. They draw heavily upon the WorldSkills Competition movement to illustrate how competitive events can be utilized in a variety of subject areas to encourage competence development and excellence and to reward participants and programs for their achievements. Several examples are presented, primarily in the United Kingdom. However, the premise is developed that the concepts involved in such competitions are applicable throughout the European area and probably worldwide.

Smeaton et al. (2002) also examined how UK Skills (a national subset of WorldSkills) promotes world-class standards in vocational skill development. They posited that UK Skills goes beyond competence development; the interest of the program is to encourage the pursuit of excellence. That is accomplished in several ways but primarily through competitions. To achieve that overall goal, a curriculum is required that promotes the mastery of skills as well as excellence in vocational learning. Five key attributes were identified: motivation and competitiveness among participants, the ability to organize work, an awareness of high standards, resilience and the ability to work under pressure, and social, communication, and teamwork skills.

Vocational Competence and Excellence

More than 9.2 million of the 14.9 million secondary school students in the United States are enrolled in some level of career and technical education (CTE) courses (Israel et al. 2012). In a study designed to assess science achievement, the researchers examined science achievement scores of CTE students in science, technology, engineering, and math (STEM) programs as well as students in health CTE and students not enrolled in any CTE or STEM program. The researchers found some differences (slightly higher of slightly lower scores) among STEM (including agriculture and natural resources) students but generally higher science scores for all groups compared to the non-STEM/CTE students. Further, science scores tended to increase as students were enrolled in additional STEM or CTE courses. The conclusion, then, was that enrolling in STEM/CTE courses does not have a negative effect on science achievement. If a concern arises regarding the importance of excellence, it could be purported that enrolling in STEM/CTE courses enhances science excellence.

The Carl D. Perkins Career and Technical Education Act of 2006 in the United States provided for the appointment of an independent panel to advise the US Department of Education on the implementation of the National Assessment of Career and technical Education (NACTE) (Independent Advisory Panel 2014). The NACTE offered three major challenges to address and enact need improvements in career and college readiness in US schools. The third challenge was to “gather robust, actionable information about the implementation and outcomes of career and technical education.” Importantly, the report called for clearer definitions of outcomes and set standards for the validity and reliability of outcome measures. Monitoring the implementation of college and career readiness programs was inherent in that effort. Seemingly, this was an initial step in defining excellence in college and career readiness federally funded programs in the United States and effort that apparently was lacking in previous legislation.

Utilizing vocational (career and technical) education student organizations to help guide the teaching and assessment of student skill development is particular to the United States. While many countries, especially in Europe and East Asia, promote and support skills competitions for school students, none are connected to a broader

organization that is designed to develop students in ways beyond skill attainment. Zirkle and Jeffery (2018) trace the history of the development of vocational student organizations and provide various examples of how those organizations are intended to develop the “whole person” instead of simply training and skill development in a specific sector of the workforce. The authors encourage the profession to delve into additional inquiry aimed at determining the extent to which student participation and student success may be related.

Three approaches to competence proficiency scaling are identified and described by Tütlys et al. (2018): methodological approaches, contextual factors, and implications for vocational and professional education. Proficiency scaling is basic to competence assessment. Scaling must involve levels of competence that can be exhibited as well as specific criteria to determine where performance falls along the established scale. Behavioral, functional, and multidimensional approaches to assessing competence are explored. Further, the context within which the competence is developed is identified as a key consideration in determining appropriate scaling methods. Various examples are provided to show how the concepts can be applied to vocational education settings.

Achieving Excellence

Establishing competence standards in vocational education and training appears to be a precursor to achieving excellence. Various methods and techniques are used worldwide to help students achieve vocational competence. An important factor related to skills development and competence is career readiness or enabling successful school-to-work transitions. Various researchers have investigated the role that skills competitions may play in skill development as well as career readiness, hopefully enhancing relevant work-life skills. Positive effects for students as well as instructors and trainers exist in certain arenas, such as WorldSkills. There appears to be a need to ascertain the extent to which vocational skills competitions, and the success of participants, enhance the image of vocational education and training.

As Nokelainen et al. (2018) and Tyson (2018) indicate, there is general agreement that excellence is worth striving for in vocational education and training. Given that stance, the next question involves the processes that are and/or could be utilized in education for excellence. Two paradigms emerge: the WorldSkills approach (discussed in other chapters) that emphasizes the attainment of a specific set of skills and the neo-Aristotelian approach with additional emphasis on virtues and dispositions relevant to the vocation. Tyson further concluded that the narrative approach is fairly well adopted in educational practice, but additional inquiry and writing is warranted on the reflective aspects of competence development and excellence. At best, additional research should address both approaches as well as the interface of the two approaches, as proposed in this chapter, ultimately leading toward greater self-awareness and understandings.

There are skills, and then there are skills needs. The discrepancy between the two (assuming the needs outpace the acquired skills) creates a skills mismatch (Na 2018). Literature through the years has used terms like employability and employability skills to discuss the need for and, at times, lack of essential work competence among potential and current employees. In essence, skills mismatches are a supply-and-demand phenomenon; business and industry create the demand for vocational and technical skill excellence, and the vocational education and training sector attempts to provide the supply to meet that demand. The discrepancy or mismatch of vocational skill development and competence creates a line of inquiry that is essential for achieving vocational education and training success. Na concluded that there remains ample opportunity for additional contributions to the debate surrounding the concept of skills development, its dynamic processes, and its consequences. Mismatches between skills development and skills needs of industry could also include a more holistic perspective as viewed through a multidimensional lens.

Work Readiness and Global Competence

Technological development continues to advance at a quickening pace (DiBenedetto 2018). Organizations in Europe and the United States have addressed the issues surrounding the development of skills and competence to meet the needs of twenty-first-century business and industry. While technical skills will remain an important aspect of vocational training and development, other areas continue to grow in importance. These skills, often referred to as employability skills, encompass all the nontechnical attributes desired in the modern worker. Being ready for work requires competence in all areas, especially since the employability skills are key for worker adaptability as the job changes and new technical skills become essential. Much of that discussion is contained within what the World Economic Forum has labeled the fourth Industrial Revolution. DiBenedetto outlines a series of constructs intended to identify the knowledge, skills, and dispositions for career readiness in a global society. They include, among others, learning and life skills, career and social skills, knowledge competencies and experiences, and interdisciplinary topics.

Pylväs and Nokelainen (2018) highlight a dimension that is often assumed within vocational education and training yet infrequently discussed and studied. That is the ability of humans throughout the world to act and interact with others in a diverse, global, complex environment. Educating future world citizens as members of the workforce requires broad understandings of the global community and intercultural communication as a part of striving for vocational education excellence. Those dimensions must be within the context of education and work. Further, the authors conclude that global competence and excellence dimensions may have created contextual imbalances such as between higher education and vocational education and training or Western versus non-Western cultures. These imbalances must be addressed in future research.

Conclusions

A variety of factors may contribute to excellence in vocational education and training in the broad spectrum of competence development. Generally, research clearly provides evidence of strong connections among those factors, with the understanding of concerns and potential issues that should lead to the next steps along the continuum of bringing clarity to future directions.

Competence-based approaches have been a mainstay of vocational education and training for many decades. One could argue that all of education is, or should be, competence-based. Foundational research in this arena has progressed from creating programs and courses that are based on competence development to massive undertakings in the assessment of learning, that is to say, in assessing the result of vocational education and training in addition to adequate planning and development at the start. From relatively simple, straightforward, short-term instructional activities, prevalent in military training, to courses, certification programs, and college degree programs, determining whether completers have gained competence beyond merely showing up for instructional activities is now the norm.

The logical extension, then, is to ascertain the degree or level of competence achieved in the vocational education and training venue. As noted periodically in the research summarized in this document, competence and excellence are often used interchangeably. But there is evidence to suggest a need for clarifying the degree of competence that learners achieve, going beyond a simple yes/no response to the question of whether the learner has achieved. Accountability measures, whether reviewing courses or complete programs, tend to measure success by “checking off” whether the standard has been met and, therefore, competence has been achieved. But this approach short changes the efforts of vocational educators and the professional training community in attempting to differentiate between those who have merely met the standard and those who have excelled.

Although competence evaluation was not a focus of this document, suffice it to say that progressing beyond simplistic measures of competence is paramount to the continued development of a well-trained workforce and provides opportunities for advancement in the job and career. Central to that movement is the ability to reward excellence beyond meeting the basic standard of achievement. In the broader education community, utilizing grading rubrics allows the assessor to indicate the level of competence in terms such as meets the standard, exceeds the standard, and displays excellence in exhibiting the standard. Truly more effort is needed in focusing on the identification of excellence if achieving excellence in competence development is the goal. Competence *and* excellence go hand-in-hand.

References

- Barrick RK (2017) Competence-based education in the United States. In: Mulder M (ed) Competence-based vocational and professional education. Bridging the worlds of work and education. Springer International Publishing, Cham

- Bell JS, Mitchell R (2000) Competency-based versus traditional cohort-based technical education: a comparison of students' perceptions. *J Career Tech Educ* 17(1). <https://doi.org/10.21061/jcte.v17i1.589>
- Bowden A (1997) Competency-based education – neither a panacea nor a pariah. TEND 97 conference, Abu Dhabi
- Commission for Adult Vocational Teaching and Learning (2012) Reaching excellence in English vocational education and training. Institute for Learning, London
- DiBenedetto CA (2018) Skills defined for work readiness in the 21st century. In: McGrath S, Mulder M, Papier J, Suart R (eds) *Handbook of vocational education and training: developments in the changing world of work*. Springer International, Cham
- Evers AT, van der Heijden BIJM (2017) Competence and professional expertise. In: Mulder M (ed) *Competence-based vocational and professional education. Bridging the worlds of work and education*. Springer International Publishing, Cham
- Hager P (2017) The integrated view on competence. In: Mulder M (ed) *Competence-based vocational and professional education. Bridging the worlds of work and education*. Springer International Publishing, Cham
- Harteis C (2017) Intuition as crucial component of professional competence: its relevance for competence-based vocational and professional education and training. In: Mulder M (ed) *Competence-based vocational and professional education. Bridging the worlds of work and education*. Springer International Publishing, Cham
- Independent Advisory Panel of the National Assessment of Career and technical Education (2014) Putting “career” in “college and career ready”: the report of the independent advisory panel of the assessment of career and technical education. Author, Washington, DC
- Israel GD, Myers BE, Lamm AJ, Galindo-Gonzalez S (2012) CTE students and science achievement: does type of coursework and occupational cluster matter? *Career Tech Educ Res* 37(1):3–20. <https://doi.org/10.5328/cter37.1.3>
- Klein-Collins R (2012) Competency-based degree programs in the U. S. Council for Adult and Experiential Learning, Chicago
- Klotz VK, Billett S, Winther E (2014) Promoting workforce excellence: formation and relevance of vocational identity for vocational educational training. *Empir Res Vocat Educ Train* 6(6). <https://doi.org/10.1186/s40461-014-0006-0>
- Mulder M (2017a) Competence theory and research: a synthesis. In: Mulder M (ed) *Competence-based vocational and professional education. Bridging the worlds of work and education*. Springer International Publishing, Cham
- Mulder M (ed) (2017b) *Competence-based vocational and professional education. Bridging the worlds of work and education*. Springer International Publishing, Cham
- Mulder M, Winterton J (2017) Introduction. In: Mulder M (ed) *Competence-based vocational and professional education. Bridging the worlds of work and education*. Springer International Publishing, Cham
- Na SI (2018) The skills dimension: skills mismatches. In: McGrath S, Mulder M, Papier J, Suart R (eds) *Handbook of vocational education and training: developments in the changing world of work*. Springer International, Cham
- Nokelainen P, Kaisvuo H, Pylväs L (2017) Self-regulation and competence in formal and informal contexts of vocational education and professional education. In: Mulder M (ed) *Competence-based vocational and professional education. Bridging the worlds of work and education*. Springer International Publishing, Cham
- Nokelainen P, Pylväs L, Rintala H (2018). Skills competition for promoting vocational excellence) In: McGrath S, Mulder M, Papier J, Suart R (eds) *Handbook of vocational education and training: developments in the changing world of work*. Springer International, Cham
- Oudshoorn-Fuller M, Robbe P, Wolfensberger MCV (2016) Professional excellence: defining learning outcomes for honours higher education. International conference on competency theory, research and practice. Wageningen University & Research, The Netherlands
- Pylväs L, Nokelainen P (2018). Global competence: towards intercultural understanding) In: McGrath S, Mulder M, Papier J, Suart R (eds) *Handbook of vocational education and training: developments in the changing world of work*. Springer International, Cham

- Rein V (2016) Compatible competence orientation of higher and vocational education. International conference on competency theory, research and practice. Wageningen University & Research, The Netherlands
- Relly SJ, Keep E (2018). Achieving and recognizing vocational excellence) In: McGrath S, Mulder M, Papier J, Suart R (eds) Handbook of vocational education and training: developments in the changing world of work. Springer International, Cham
- Smeaton B, Hughes M, Hall G (2002) From competence to excellence: developing excellence in vocational skills. Learning and Skills Development Agency, London
- Smith JJ (2010) Outcomes based education vs. outcomes based training and education. Is there a difference? Center for Teaching Excellence, U. S. Military Academy, West Point
- Soares L (2012) A 'disruptive' look at competency-based education. Center for American Progress, Washington, DC
- Solomon GH, Wesselink R, Mulder M (2016) Realization of competence-based education and training: Teachers' students' and graduates' perspectives. International conference on competency theory, research and practice. Wageningen University & Research, The Netherlands
- Suvedi M, Ghimire R (2018). Attributes of vocational excellence) In: McGrath S, Mulder M, Papier J, Suart R (eds) Handbook of vocational education and training: developments in the changing world of work. Springer International, Cham
- Tütlys V, Aarna O (2017) Competence-based approach in the education reforms of Lithuania and Estonia. In: Mulder M (ed) Competence-based vocational and professional education. Bridging the worlds of work and education. Springer International Publishing, Cham
- Tütlys V, Winterton J, Tacconi G (2018). Competency proficiency scaling) In: McGrath S, Mulder M, Papier J, Suart R (eds) Handbook of vocational education and training: developments in the changing world of work. Springer International, Cham
- Tyson R (2018). Educating for vocational excellence) In: McGrath S, Mulder M, Papier J, Suart R (eds) Handbook of vocational education and training: developments in the changing world of work. Springer International, Cham
- Zirkle C, Jeffery J (2018). Vocational student organizations and student success) In: McGrath S, Mulder M, Papier J, Suart R (eds) Handbook of vocational education and training: developments in the changing world of work. Springer International, Cham