Hungarian Educational Research Journal 12 (2022) 4, 475–492
DOI: 10.1556/063.2022.00118

AKADÉMIAI KIADÓ

Professional competencies and the continuing professional development needs of Technical, Vocational Education and Training (TVET) teachers in Kenya

MOSES NJENGA*

Eötvös Loránd University, Budapest, Hungary

RESEARCH ARTICLE

Received: December 9, 2021 • Accepted: January 21, 2022
Published online: May 4, 2022

ABSTRACT

The development of Continuing Professional Development (CPD) programs for vocational teachers in Africa has been hampered by a lack of relevant research on their CPD practices and learning needs. This study therefore investigated the learning needs of vocational teachers in Kenya based on the professional competencies vocational teachers identify as essential for their work and their self-perception of competence.

Using a concurrent mixed methods approach, data was collected from 170 questionnaire respondents and sixteen interview participants from six Technical, Vocational Education and Training (TVET) institutions in Kenya.

Despite TVET teachers perceiving themselves as highly competent, they were found to express a relatively high need for CPD. The need was most strongly expressed by teachers who had received Initial Teacher Education (ITE), which suggested that ITE has a positive influence in sensitising teachers on the need for CPD. New teachers were however found to have a lower perception of competence. Mentorship for new teachers is thus recommended.

An unexpected finding was that while TVET teachers in Kenya identify good teaching skills as an essential competency for vocational teachers, they assume mastery of content translates to good teaching

* Corresponding author. E-mail: gundanjenga@gmail.com

skills. It is thus recommended that the curriculum for TVET teachers in Kenya be reviewed to help teachers appreciate, identify, and develop subject-specific teaching skills.

KEYWORDS

self assessment, professional competencies, vocational teachers, Kenya, continuing professional development

INTRODUCTION

The quality of Technical, Vocational Education and Training (TVET) strongly depends on the professional competencies of TVET teachers (Avis & Orr, 2014; Gamble, 2013). Accordingly, a key issue in TVET today is supporting vocational teachers to improve their professional competencies (Gamble, 2013; Misra, 2011). However, for the support offered to be effective, it must be informed by a keen understanding of the key professional competencies TVET teachers need to be effective in their work as well as the learning needs TVET teachers have.

Researchers have therefore investigated the professional competencies TVET teachers need and have, how competent vocational teachers perceive themselves to be, and how self-perception of competence influences Continuing Professional Development (CPD) needs and participation in CPD (Andersson & Köpsén, 2015).

Professional competencies and learning needs are however context dependent. CPD programmes must thus be informed by research that looks at specific contexts (Appova & Arbaugh, 2018). Unfortunately, research focusing on the CPD practices of TVET teachers in Africa, is still limited (Grijpstra & Papier, 2014; Rawkins, 2018). In particular, few studies have reported on the professional competencies and professional development needs of TVET teachers in Kenya. This study therefore aimed at establishing what competencies TVET teachers identify as essential for their work, how competent TVET teachers perceive themselves to be, and their need for CPD.

Professional competency

Professional competence has been the subject of wide ranging research and debate and has thus been viewed, defined, measured, and theorised differently (Antera, 2021; Blömeke, Gustafsson, & Shavelson, 2015; Schaffar, 2019). In her review of the concept, Antera (2021) notes that the concept of professional competence cannot be easily defined because of the abstract and complex nature of the concept and the multiple and varied historical uses of the term. Blömeke et al. (2015) make a similar observation, noting that while some scholars view professional competency as a display of a set of behaviours that lead to successful performance, others view it as a set of underlying traits that lead to successful performance. Similarly, its assessment is dichotomised into analysis of desired behaviours in real world settings or analysis of desired traits in context free settings. Blömeke et al. (2015) integrate the diverse views and recommend looking at competence as a continuum; a continuum of traits (cognitive, affective, and motivational) that underlie and support perception, interpretation, and decision making, which lead to effective performance.

Adopting the definitions and for the purposes of this study, TVET teacher competence is defined as the combination of knowledge, skills and attitudes that enable effective performance of TVET teacher roles in the context which the teacher plays the roles.

Professional competencies of TVET teachers. Not withstanding the lack of a single and unifying definition of competence, discussions and research about competence have continued to take place. With respect to teacher competencies, diverse sets of competencies have been identified (Guerriero & Deligiannidi, 2017; Sigrid Blömeke, 2017).

Perhaps the most exhaustive and widely used categorisation of teachers' professional competencies was done by Shulman (1986). Shulman focused on knowledge as the foundation of the competencies effective teachers have. From his analysis, he identified Subject Content Knowledge (SCK), Pedagogical Content Knowledge (PCK), and General Pedagogical Content Knowledge (GPK) as the three key domains of knowledge effective teachers have (Gamble, 2013; Guerriero & Deligiannidi, 2017; Neumann, Kind, & Harms, 2019; Shulman, 1986).

The same framework is applied to vocational teachers with little change, apart from specifying that for vocational teachers, their subject content knowledge has both theoretical and technical/practical elements (Gamble, 2013). These technical and practical elements change rapidly due to scientific progress and the change implies that TVET teachers have to keep up to date with changes in scientific theory and in industry and workplace practices (Andersson & Köpsén, 2015).

Prior research

Other than looking at the forms of teachers' professional competencies, researchers have also looked at what influences teachers to perceive themselves as competent. One of the key findings has been the strong role Initial Teacher Education (ITE) and teacher CPD play in developing a strong sense of competence in teachers. For example, in Teaching and Learning International Survey (TALIS) of 2018, teachers were found to feel more competent in a given domain of teacher competence if they had been trained in that domain during their training (OECD, 2019).

Another strand of research on teachers' professional competences has focused on how self-perception of competence influences teacher professional development. Underlying such research is the view that self-perception of competence (as part of the wider concept of self-awareness) plays an important role in professional development. Self-perception of competence influences when individuals look for and utilize opportunities for professional development (Panadero, Garcia, & Fraile, 2018; Rojewski et al., 2021; van Loon, 2018).

Self-perception of competence is informed by prior experience with similar tasks, self-efficacy beliefs, self-comparisons with others, feedback from others, and results of psychometric tests. Since self-estimates are based on different situations, the estimates are found to be domain and context specific (Freund & Kasten, 2012).

Given the strong link between self-perception of competence and professional development, past research has looked at how competent teachers feel and the ensuing learning needs teachers have. The findings are then used to inform the development of training programs or evaluate the impact of a training program (Anstey & Clarke, 2010; Cannon, Kitchel, Duncan, & Arnett, 2011; Clemons, Heidenreich, & Lindner, 2018; Lupton, 2021; Rojewski et al., 2021; Schmid, Brianza, & Petko, 2021). In their study, Naliakamukhale and Hong (2017) used semi-structured interviews to identify the learning needs of lecturers in Kenyan universities. They found that lecturers desire CPD delivered through both face-face and online modes.

Theoretical framework

This study was guided by the Adult Learning Theory. Adult Learning Theory views adults as self-directed learners who seek learning to solve identified or perceived challenges in role

performance. As self directed learners, adults have the capacity to evaluate their role performance objectively and accept feedback about their performance non-defensively. This ability enables adults to diagnose their learning needs in terms of the competencies they need to develop in order to improve their performance. This means that adult learning is a consequence of, and a solution to, perceived performance challenges. Since performance is context dependent, learning needs arise in the context within which an adult plays his or her roles (Henschke, 2009; Knowles, 1970).

With respect to TVET teachers, TVET teachers seek learning as a consequence of perceiving challenges or difficulties as they perform their teaching roles. The challenges reflect gaps in the competencies that they need to achieve their desired levels of performance. The influence of context however means that one group of TVET teachers may report competencies and learning needs that differ from those reported by a different group.

From a methodological point of view, the Adult Learning Theory implies that TVET teachers are capable of assessing the competencies, knowledge, and skills they need to teach effectively. In addition, they are capable of identifying the content they need to learn in order to address the competency gaps they have identified.

Based on the foregoing, and for the purposes of this study, TVET teachers as adults are capable of identifying competencies essential for their work and self-evaluating their competence levels and learning needs. It is therefore possible to identify the competencies TVET teachers in Kenya identify as essential for their work by interviewing them. Also, by means self-assessments of competence and learning needs, it is possible to assess how competent TVET teachers perceive themselves to be and the learning needs they have.

Context of the study

Located in East Africa, Kenya is a developing country with a well established vocational education system that is in transition. TVET, as vocational education in Kenya is more commonly referred to, is offered by public, private and religious institutions, with the government funded institutions accounting for the largest share.

TVET in Kenya is well diversified in terms of study programs and levels. Study programs include engineering, agriculture, and business programs. Students without secondary education attend Vocational Training Centres or Youth Polytechnics. Studies at this level lead to the award of artisan certificates. Students with secondary education attend Technical and Vocational Colleges or Technical Training Institutes where two year studies lead to the award of craft certificates and three year studies lead to the award of diploma certificates. TVET teachers need a minimum of a diploma in their trade area and pedagogical training to teach at the Vocational Training Centres. Techers in the Technical and Vocational Colleges need a minimum of a Bachelors degree (UNESCO-UNEVOC, 2018).

Kenya's vocational education system has undergone quantitative and qualitative changes in the recent past. Quantitatively, the system has undergone rapid expansion with new TVET institutes being established and student numbers more than doubling. Qualitatively, multiple policy changes and curriculum changes are being implemented. Some of these include the establishment of new administrative bodies to manage and finance TVET in Kenya as well as to assure quality. With respect to the curriculum, the vocational education system is transitioning to a competency based system of education and training (Akala & Changilwa, 2018; Ministry of Education Sector Working Group, 2019).

The above changes have been taking place with the aim of improving the quality of TVET in Kenya. While there are multiple challenges to improving the quality of TVET in Kenya, a persistent issue has been the shortage of highly competent TVET teachers. This challenge been attributed on the one hand to a gross shortage in the number of TVET teachers leading to worsening student-teacher ratios and heavy work-loads. On the other hand, some TVET teachers lack sufficient content knowledge, industry experience, or training in pedagogy (Akala & Changilwa, 2018; Ferej, Kitainge, & Ooko, 2012; Oketch, 2014; Sifuna, 2020).

One solution to the challenge of inadequate professional competencies of TVET teachers is to expand the opportunities for and effectiveness of TVET teacher CPD. This is however not possible without insights into the professional competencies teachers feel they need to develop. Unfortunately, the development of TVET teacher CPD programs and policies in Kenya has been hampered by a lack of relevant research on the CPD practices and learning needs of TVET teachers in Kenya. This challenge extends to other countries in Africa as well (Grijpstra & Papier, 2014).

RESEARCH QUESTIONS

To bridge this gap, this study investigated the learning needs of TVET teachers in Kenya based on the professional competencies TVET teachers identify as essential for their work and their self-perception of competence. To guide the research, the following research questions were posed:

RQ1: What professional competencies do TVET teachers in Kenya identify as essential for their work?

RQ2: How competent do TVET teachers in Kenya perceive themselves to be?

RQ3: What professional competencies do TVET teachers in Kenya wish to learn the most?

METHODS

As part of a wider study focusing on the continuing professional development practices of TVET teachers in Kenya, the present study adopted a concurrent mixed methods approach. The concurrent mix of methods involved collecting quantitative data using a survey questionnaire and qualitative data using interviews. The data was then analysed concurrently to arrive at a single set of findings.

Data was collected from teachers in six public TVET institutes in Kenya's Nairobi Metropolitan Area. Due to access challenges, the institutes were selected by convenience. The survey participants were selected by simple random sampling at the institutes while the interview participants were selected by convenience. The criterion set for participation in the interviews was that a male and female teacher participated in the interviews from each institute. Data was collected over the months of January and February in year 2021 after ethical permission and a research licence was obtained. Ethical Permission was obtained form the Ethical Committee of the Psychology and Pedagogy Faculty of Eotvos Lorand University while research license was obtained from the National Council of Science and Technology in Kenya.

Quantitative data was collected using a questionnaire that asked respondents to self evaluate on a five point Likert type scale. Respondents were asked to indicate how confident they felt with respect to their competency and consequently the extent to which they needed professional development.

The items used in the questionnaire were similar to the items measuring the need for professional development as used in the 2013 and 2018 TALIS surveys (OECD, 2013, 2018). After a pilot study, several items borrowed from the TALIS survey with very low response rates were dropped. The items dropped related to the teaching for multi-cultural settings, an issue that does not frequently arise in the Kenyan TVET sector.

Three key professional competence domains were evaluated in the self-assessment of competence. These are subject-content knowledge, teaching skills and general educational knowledge. Subject-content knowledge referred to mastery of the subject matter and practical skills that a teacher was expected to teach. Teaching skills referred to the abilities of the teacher to organise and present content in ways that students could understand. General education knowledge referred to the general awareness of the educational context, values and ethics of teaching.

Interview data was collected concurrently from a smaller sample of teachers. Participants were asked to describe the key competencies TVET teachers need and the extent to which the participants and their colleagues need professional development targeting those competencies. To get an insight in the continuing professional development practices, participants were asked to assess if their competencies had improved compared to when they started teaching and what explains that improvement. The interviews were recorded electronically, transcribed, coded, and analysed on ATLAS.ti.

Interview data was inductively coded and thematically analysed using the coding and thematic analysis guidelines suggested by Saldaña (2013). Survey data was analysed using descriptive and inferential statistics on SPSS. The findings from the two sets of data were then compared and combined to develop a holistic view of the professional competences and learning needs of TVET teachers in Kenya.

RESULTS

Participants and their characteristics

In total, 170 validly filled questionnaires were returned. By gender, 68 per cent were filled by male teachers and 32 per cent were filled by female teachers (male: 116 and female: 54). The distribution by gender was similar to the national distribution of TVET teachers. As of August 2020, there were 5,622 TVET teachers employed by the Public Service Commission of Kenya, of which, 3,676 are male and 1,946 are female, i.e., 65.39% of the teachers are male and 34.61% are female (MoE-Directorate of Technical Education, 2020).

Majority of the survey respondents have received professional training to work as teachers, with two thirds of the respondents having received the training before they were employed as teachers. Fourteen per cent of the respondents received pedagogical training after they started teaching and the rest, one fifth of the respondents, were yet to receive pedagogical training. The most common educational qualification into teaching is a Bachelors degree from a university, with 65 per cent of the respondents indicating that this was their entry qualification into

teaching. The second most common qualification is a diploma (i.e. non-university tertiary education certificate). Thirty five per cent of the participants started teaching with a diploma. Only two respondents started teaching with a Masters Degree.

The distribution of the survey participants by career stage and educational qualifications is shown in the Table 1 below. Teachers were categorised as Early Career Stage, if they had worked for less than five years, Middle Career Stage, if they had worked for between six and twenty years, and Late Career Stage, if the had worked for more than twenty years.

For the interviews, sixteen teachers participated. Seven of the participants were female and nine were male. Three of the interviewed participants were early career stage teachers, nine were middle career stage teachers and four were late career stage teachers. One of the interviewed participants had a higher national diploma, eight had a Bachelors degree, six had a Masters degree, and one had a PhD.

As vocational teachers, the teaching areas of the survey and interview participants were in traditional engineering trades, ICT, and science and laboratory technologies. Others were in business and social studies.

Professional competencies of TVET teachers. To obtain descriptive views of the professional competencies TVET teachers need, interview respondents were asked to describe the competencies they deem essential for working as a TVET teacher. The responses received were then used to develop at an outline of the knowledge, skills, and attitudes that define a competent TVET teacher in Kenya. Three main categories emerged, i.e., subject content knowledge, general pedagogical knowledge, and pedagogical content knowledge. A fourth category, life skills also emerged. Demonstrable mastery of knowledge also emerged as a sub-category of subject content knowledge, but with significant overlap with the pedagogical content knowledge category. Knowledge of students was a subcategory of pedagogical content knowledge but it also overlapped with the general pedagogical content knowledge category. The codes, emergent categories, and their associations are shown in the Fig. 1 below. While other competencies can be identified such as curriculum development, interview respondents did not mention them. This is possibly because they have not had the need to apply these competencies in the past.

The analysis of the responses by the interview respondents revealed that the most frequently mentioned and stressed competency was mastery of content. Respondents indicated that a competent teacher must be able to demonstrate mastery of content and deliver the content to students.

Table 1. Career stage by educational qualifications

		Educational Qualifications				
		Diploma	Bachelor	Masters	PhD	Total
Career Stages	Early	12	56	6		73
	Middle	7	35	21		63
	Late	10	7	15	2	34
	Total	28	98	42	2	170

Note that in Kenya, a diploma refers to a certificate of completing three years of non-university tertiary education.

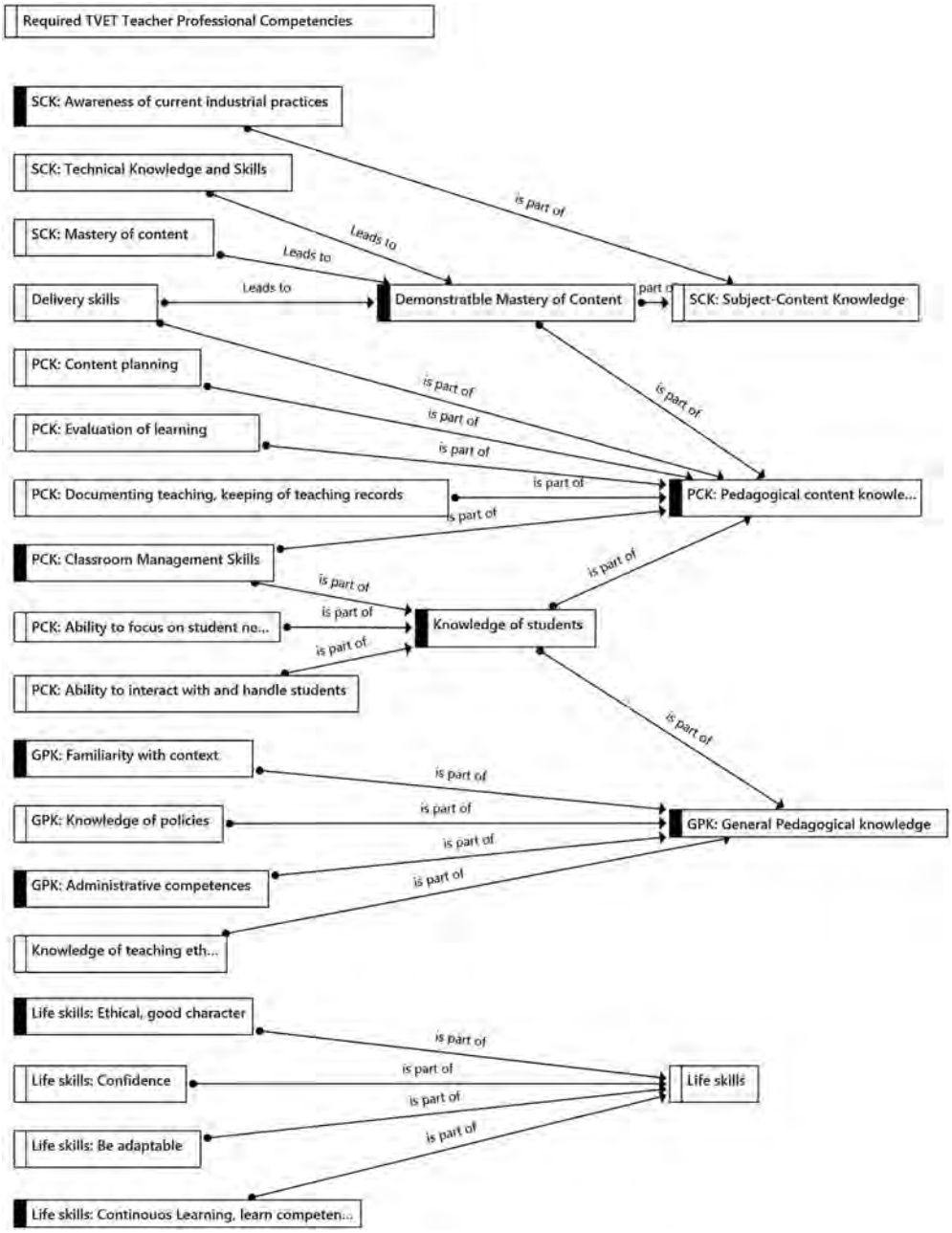

Fig. 1. TVET teacher professional competencies

Interviewer:

What are the specific types of knowledge or skills that you would say a professional teacher must have?

McTTi_3:

Yes, for a teacher…….there is something we call subject mastery, for example if you are trained in a certain section or field, you are supposed to have mastered that field, so that as you transfer knowledge and skills to the trainees, your must be proficient in that area.

NbTTI_1:

Once you get the mastery of a trade area, it becomes very easy to connect with the teaching skills you had. But at times, if you have teaching skills and lack the mastery of content, things will never be easy.

To be able to demonstrate mastery of content, a competent teacher was described as one who has learnt and mastered the theoretical knowledge and practical skills a TVET teacher is required to teach. In addition, such a teacher is able to "delivery that content". Mastery of content was thus seen as inseparable from the ability to transfer content to students in a way that students could understand. The phrase commonly used by the respondents was "delivery skills", referring to what is more formally described as pedagogical content knowledge.

NbTTi_2:

For you to be a good teacher, you have to have skills in being able to deliver to your students, and also giving guidance to the students, following up and encouraging… basically that is it.

To support the "delivery of knowledge and skills", competent teachers were also described as having good knowledge of students and therefore have the ability to understand and respond to the needs of students. Additional competencies mentioned were skills related to evaluation of learning, guiding and helping students pass in their examinations, content and lesson planning, and classroom management.

Respondents also identified competencies emanating from general pedagogical knowledge as essential. These included familiarity with current educational practices and policies and administrative competencies such as keeping records and documenting teaching activities.

Owing to their view of teaching as more than instruction, respondents also described competent teachers as having a "good character". Competent teachers are thus expected to be ethical and to have good knowledge of teaching ethics. As one teacher put it:

MaTTi_2:

For you to be a professional teacher you need the content in the area of specialization, the rest is character.

To support the above competencies, competent teachers were also described as possessing life skills such as remaining adaptable and having life-long learning skills.

ThTTi_3:

As a teacher you should have a competency of acquiring additional information along the way. That should be a prerequisite; so that, as a teacher, you are not just relying on what you have used all along. You have to be update with your area, the happenings that have been going on in your area at that particular time. And, then, how you pass it on to the learners, how you marry it with their experiences.

Self-perception of competence. When interview respondents were asked how competent they felt at present compared to when they started teaching, all participants said they felt more competent and confident as teachers. A key area of competence development was acquisition of mastery over content and therefore the ability to deliver the content. That is, participants felt that they could now comfortably teach the subject content knowledge they were supposed to teach. Related to this was the development of the technical skills related to their subjects. Other acquired competencies were "knowing how to make students pass in their examinations" and "knowing how the system works".

These competences had developed over time. As such, when asked how they had acquired and developed their professional competencies to the point of feeling competent and confident, experience was a common response. Other means of professional development were mentorship, and the various formal CPD activities such as workshops that the teachers had participated in. Prior work experience in industrial settings was also identified as an invaluable source of professional development.

To assess the general self-perception of competence, survey participants were asked to indicate how confident they felt with their professional competencies. Three key professional competence domains were used in the assessment, i.e., subject-content knowledge, teaching skills and general educational knowledge. The mean-self-assessment of competence was a simple average of the three domains of teacher competence. The average self-ratings and standard deviations are presented in the Table 2 below. The results show that teachers have a relatively high perception of competence.

Background characteristics and self-assessment of competence. To investigate if background characteristics of teachers influence the self-perception of competence, the mean-self-assessment of competence was compared against the background teacher characteristics. This was done using either a T-test or an ANOVA-test depending on the background characteristic being investigated. No significant differences were found between mean-self-assessments of competence across the categories of gender, age, educational qualifications, job-group, career stage, and prior work experience. However, mean-self-rating of competence was found to be statistically

Table 2. Average-self-ratings of competency across career stages

Teacher competency domain	Career stages				Average
	New teachers (0–2 years)	Junior teachers (3–5 years)	Middle CS teachers (6–20 years)	Late CS teachers (20+ years)	
Subject content knowledge	3.91	4.05	4.22	4.26	4.13
Teaching skills	3.64	3.95	4.24	4.21	4.05
General educational knowledge	3.88	4.03	4.27	4.15	4.11
Average self-assessment	3.81	4.01	4.24	4.21	4.10

Table 3. Need for professional development

Competence sub-domain	Mean	Std. deviation
Subject knowledge	3.42	1.100
New technologies in the workplace	4.04	0.890
Teaching methods specific to my field	3.28	1.221
ICT skills for teaching	3.74	1.055
Student evaluation and assessment	3.57	1.101
Knowledge of educational goals, purposes and values	3.39	1.124
Curriculum theory and development	3.50	1.070
School management and administration	3.76	0.959
Knowledge of learners and their characteristics	3.53	1.129
Guidance and counselling	3.63	1.004
Mean Need for CPD	3.59	0.809

significantly higher for teachers who had received initial teacher education than for teachers who had not ($t = 2.68$, $df = 168$, $P < 0.05$).

Similar analysis was done for each sub-domain of teacher competence. Statistically significant differences were found only with respect to the average-self-ratings of competence in the teaching skills competence, F (3, 166) = 4.475, P<0.05. A Tukey HSD post hoc test showed significant differences between New Teachers (M=3.64, SD=0.929) and Middle Career Stage Teachers (M=4.24, SD=0.615) and Late Career Stage Teachers (M=4.21, SD=0.808). Table 2 above shows the average self-ratings of competency in the three sub-domains with respondents grouped by career stages.

The average-self-ratings of mastery of subject content knowledge and general educational knowledge were not found to differ significantly among the four categories of teachers by career stage.

Need for CPD. To assess the extent to which teachers need professional development survey participants were asked to indicate how strongly they felt the need for professional development in the sub-domains of teacher professional competence. Participants felt the greatest need to learn about new technologies in the workplace followed by learning about school management. The third most needed professional development was on learning about ICT skills for teaching. The rest of the data is captured in the Table 3 above.

Interestingly, the survey showed a low need for professional development in teaching methods, yet the teachers felt least competent in the teaching skills competence. The low need for professional development in teaching methods gets even more interesting considering that good "delivery skills" were identified as a key competency for teachers during the interviews.

Focus on mastery of content. The above finding contradicted the theoretical framework guiding the study. According to the theoretical framework, if teachers value good delivery skills and at the same time feel least competent in the teaching skills competence, then teachers would show a relatively high need for professional development in teaching methods.

Both sets of data however showed that teachers place a priority on subject-content knowledge. The survey data showed that teachers are most interested in improving their subject-content knowledge while interview data showed that teachers place a priority on subject-content knowledge while viewing pedagogical content knowledge as only a minor competency.

KbTTi_1:

Okay, pedagogy contributes maybe 20 per cent. But what matters is content.

NbTTI_1:

Content first, and then teaching and pedagogy to come later. After all, the pedagogy one is maybe to upgrade, some refresher.

Re-looking at the qualitative data, it was noticed that the terms "delivery skills" and "demonstrable mastery of content" meant good teaching skills. That is, having mastery of content meant having the ability to teach. Teachers thus appear to conflate mastery of content with good teaching skills. Several interviewees felt that having developed good mastery of content, a teacher could teach and deliver comfortably. This suggests that teachers conceive good teaching as simply the outcome of good mastery of content.

Thus, while the teachers described good teachers as those who possess good delivery and teaching skills, these skills are assumed to rest solely on having mastery of content rather than on developing subject specific teaching methods. In fact, when asked about subject specific teaching methods, one teacher admitted that she was not very familiar with the concept.

Interviewer:

It seems like a lot of focus is on content, things like what to teach, i.e., content knowledge. But what about the pedagogical content knowledge, things like how to best teach that content? Do teachers focus on this? Have you for example ever tried searching for special methods in teaching mechanical technology?

KbTTi_2:

No. Maybe now I will do it because you have given me an idea. I have never thought of that…… Like that one of drawing; we always have a problem teaching that.

Interviewer:

But technical drawing is a very abstract thing. How do teachers improve their teaching skills in it?

KbTTi_2:

Hey, no. That one I have no idea. They just do it and hope it works.

Some teachers though are aware of the importance of pedagogical content knowledge in enabling teaching and learning.

McTTi_1:

Yeah, the pedagogical skills are very important. Because you might have the content, but then you do not know how to deliver the knowledge. You maybe do not know how to use the chalk board effectively, or even how to explain some of the concepts.

While other teachers are aware about subject specific teaching methods, they seem not to have had a chance to develop such knowledge and skills related to it during their teacher training.

MuTTi_1:

I look at this way: I lecture mathematics today, and when you look at the mathematics I teach, it is what I did in my diploma, no one ever came in to bring the issue of how to actually teach mathematics. It is me, as a mathematics teacher who had to find ways of how to actually teach mathematics.

DISCUSSION

One aim of the study was to identify the professional competencies that TVET teachers in Kenya identify as essential for their work. From the analysis of the interviews, teachers identified mastery of content and delivery skills as key competencies for TVET teachers in Kenya. Other competencies are classroom management skills, the ability to interact with students while focusing on their needs, planning and documenting teaching activities, and evaluating learning. Life skills such as being able to keep up to date and develop awareness of the educational and technological contexts, having an ethical attitude, learning to learn, and confidence were also identified as essential professional competencies.

The competencies identified closely mirror those identified by Shulman (1986) and are close restatements of Shulman's categories. Mastery of content refers to subject content knowledge, while teaching and delivery skills refer to pedagogical content knowledge. General awareness of the educational and technological context refers to general pedagogical knowledge. It can therefore be concluded that the competence domains described by TVET teachers in Kenya agree with existing theoretical frameworks.

The second aim of the study was to investigate the influence of teacher characteristics on self-perception of competence and the need for CPD. Quantitative analysis showed that teachers who had already received pedagogical training, i.e. Initial Teacher Education (ITE), had higher self-rating of competence than those who had not. TALIS 2018 similarly found teacher preparation and CPD lead to higher self-assessments of competence (OECD, 2019).

Analysis also showed that teachers who had received pedagogical training had a higher mean-desire to participate in CPD. The results thus indicate that the educational profile of teachers strongly influences the self-perception of competence and the desire to participate in CPD. It is possible that Initial Teacher Education makes teachers feel more competent and confident while sensitising teachers on the value of CPD. Thus, teachers who have received pedagogical training have a stronger desire to improve their professional competences even if they feel relatively competent. This agrees with the lay wisdom that the more we learn, the more we wish to learn. Anstey and Clarke (2010) had arrived at a similar conclusion. Thus, it is no wonder that teachers who are already well qualified continue to express a stronger need for CPD.

Analysis also showed that new teachers who had worked for less than two years had a lower self-perception of competence compared to teachers who had worked for more than five years. This agrees with other studies that have found that new teachers feel more challenged in taking up their teaching roles. It further highlights the need for mentoring systems to support new teachers.

The final aim of the study was to investigate the relationship between self-perception of competence and the need for CPD. Analysis of quantitative data did not show any significant interactions between the self-ratings of competence and expressed need for CPD in any of the selected competence domains.

Qualitative data showed that a key competency for teachers is having good teaching and delivery skills. However, quantitative data showed that teachers were more interested in improving their subject-content knowledge and expressed a relatively low need for CPD focusing on teaching skills. Relooking at the data, it was found that many teachers assume that mastery of content knowledge implies being able to deliver knowledge to students.

Teachers further seem to be unaware that teaching skills (i.e., pedagogical content knowledge) can be developed by learning pedagogical techniques specific to the content they teach. Teachers, as adult learners can only diagnose learning needs in accordance with the competency models that they are aware of and use (Henschke, 2009). Where the competency model in use does not specify a particular competency, the need to develop the competency will not be felt. Teachers should thus be encouraged to adopt wide and exhaustive teacher competency models. Otherwise, they will remain unaware of the competencies they need to develop.

The unawareness of the need to develop the pedagogical content knowledge competency suggests that that Initial Teacher Education (ITE) for vocational teachers in Kenya lacks sufficient focus on learning the so called "special subject methods". Instead, it appears ITE in Kenya focuses on, and stresses, subject knowledge and pedagogical knowledge while ignoring pedagogical content knowledge.

It is likely that "subject methods" is not well taught during initial teacher training. A comparative study of the curriculum used by the Kenya Technical Teachers College (KTTC) and Moi University (the two national institutions that train TVET teachers in Kenya) found that the "subject methods course" is offered only at Moi University. Further, the subjects methods course at Moi University is stated as a general course for technology education without focus on specific content areas such as technical drawing and engineering mathematics (Oroni, 2012). Of note is that KTTC produces a significant proportion of TVET teachers in Kenya. As such, if its curriculum does not focus on a key competence domain, a significant portion of TVET teachers will remain handicapped. This challenge is however not unique to Kenya. Hoekstra, Kuntz, and Newton (2018) noted that owing to the highly technical nature of TVET content, relevant PCK is often not available. All this suggests a strong need to update the curriculum that TVET student-teachers undergo to support the development of subject specific teaching methods.

Limitations

A possible limitation with the research is the choice of data collection. Self-assessments of knowledge and ability are known not be accurate, with individuals tending to be positively biased (Zell & Krizan, 2014; van Loon, 2018). The ratings recorded above have to be interpreted in this light. Participants were also selected from one region of the country. While the region is largely representative, the fact that the data was collected from only one region limits the generalizability of the results. Further, a large proportion of the survey participants were in the early career stages. Accurate data on the age and career stage distribution of TVET teachers in Kenya could not be obtained to confirm if the study sample distribution matches the national distribution. The survey findings should therefore be interpreted taking this into account.

SUMMARY AND CONCLUSION

This study aimed at establishing what competencies TVET teachers identify as essential for their work, how competent TVET teachers perceive themselves to be, and their need for CPD. The study established that despite teachers perceiving themselves as highly competent, they still express a relatively high need for CPD. Further, the need for CPD was most strongly expressed by teachers who had received Initial Teacher Education (ITE), which suggested that ITE has a positive influence in sensitising teachers on the need for CPD. New teachers were however found to have a lower perception of competence. Mentorship for new and junior teachers is thus recommended.

An unexpected finding was that while teachers identify good teaching skills as an essential competency for TVET teachers, teachers assume mastery of content translates to good teaching skills. It was concluded that vocational teachers in Kenya have a low appreciation of the value of pedagogical content knowledge. It is thus recommended that the curriculum for vocational teachers in Kenya be reviewed to help teachers appreciate the value of skills related to Pedagogical Content Knowledge (PCK) and on the use of systemic strategies to support the development of subject-specific teaching skills. In light of these findings, it is imperative that the government, through the TVET teachers' employer, develops and implements CPD programs focusing on helping practicing TVET teachers in Kenya improve their knowledge and skills of subject-specific teaching methods.

ACKNOWLEDGEMENT

The authors report no financial or other relationship relevant to the subject of this article.

ABOUT THE AUTHOR

Moses is a PhD candidate at Eotvos Lorand University with an interest in the professional development of teachers. His research explores the Continuing Professional Development (CPD) practices of TVET teachers in Kenya. After his Masters Degree in Education at the University of Madras in Chennai, India, he held a teaching position at Machakos University in Kenya.

REFERENCES

Akala, W. J., & Changilwa, P. K. (2018). Status of technical and vocational education and training (TVET) in post-secondary education in Kenya. *Journal of Popular Education in Africa*, *2*(7), 15–25. http://www.jopea.org/index.php/current-issue.

Andersson, P., & Köpsén, S. (2015). Continuing professional development of vocational teachers: Participation in a Swedish national initiative. *Empirical Research in Vocational Education and Training*, *7*(1), 7. https://doi.org/10.1186/s40461-015-0019-3.

Anstey, L., & Clarke, B. (2010). Perceived professional learning needs of numeracy coaches. In L. Sparrow, B. Kissane, & C. Hurst (Eds.), *Proceedings of the 33rd annual conference of the mathematics education research group of Australasia* (pp. 45–52). Mathematics Education Research Group of Australasia. https://files.eric.ed.gov/fulltext/ED520874.pdf.

Antera, S. (2021). Professional competence of vocational teachers: A conceptual review. *Vocations and Learning*, *14*(3), 459–479. https://doi.org/10.1007/s12186-021-09271-7.

Appova, A., & Arbaugh, F. (2018). Teachers' motivation to learn: Implications for supporting professional growth. *Professional Development in Education*, *44*(1), 5–21. https://doi.org/10.1080/19415257.2017.1280524.

Avis, J., & Orr, K. (2014). The new professionalism: An exploration of vocational education and training teachers in England. In S. Billett, C. Harteis, & H. Gruber (Eds.), *International handbook of research in professional and practice-based learning* (pp. 1099–1124). Dordrecht: Springer. https://doi.org/10.1007/978-94-017-8902-8_40.

Blömeke, S., Gustafsson, J. E., & Shavelson, R. J. (2015). Beyond dichotomies: Competence viewed as a continuum. In *Zeitschrift fur Psychologie/Journal of Psychology* (Vol. *223*, Issue 1, pp. 3–13). Hogrefe Publishing. https://doi.org/10.1027/2151-2604/a000194.

Cannon, J. G., Kitchel, A., Duncan, D. W., & Arnett, S. E. (2011). Professional development needs of Idaho technology teachers: Teaching and learning introduction and theoretical framework. *Journal of Career and Technical Education*, *26*(1). https://files.eric.ed.gov/fulltext/EJ940548.pdf.

Clemons, C. A., Heidenreich, A. E., & Lindner, J. R. (2018). Assessing the technical expertise and content needs of Alabama agriscience teachers. *Journal of Agricultural Education*, *59*(3), 87–99. https://eric.ed.gov/?id=EJ1192611.

Ferej, B. A., Kitainge, K., & Ooko, Z. (2012). Reform of TVET teacher education in Kenya: Overcoming the challenges of quality and relevance. *Triennale on Education and Training in Africa*, 1–23.

Freund, P. A., & Kasten, N. (2012). How smart do you think you are? A meta-analysis on the validity of self-estimates of cognitive ability. *Psychological Bulletin*, *138*(2), 296–321. https://doi.org/10.1037/a0026556.

Gamble, J. (2013). Why improved formal teaching and learning are important in technical and vocational education and Training (TVET). In *Revisiting global trends in TVET: Reflections on theory and practice* (pp. 204–238). UNESCO-UNEVOC.

Grijpstra, D., & Papier, J. (2014). TVET teacher education in Africa. *Synthesis Report*, *23*(09). http://ec.europa.eu/dgs/education_culture/repository/education/library/reports/tvet-africa-report_en.pdf.

Guerriero, S., & Deligiannidi, K. (2017). The teaching profession and its knowledge base. In S. Guerriero (Ed.), *Pedagogical knowledge and the changing nature of the teaching profession* (pp. 19–35). OECD. https://doi.org/10.1787/9789264270695-3-en.

Henschke, J. A. (2009). *A perspective on the history and philosophy of andragogy: An international sketch*. IACE Hall of Fame Repository. https://trace.tennessee.edu/utk_IACE-browseall/429.

Hoekstra, A., Kuntz, J., & Newton, P. (2018). Professional learning of instructors in vocational and professional education. *Professional Development in Education*, *44*(2), 237–253. https://doi.org/10.1080/19415257.2017.1280523.

Knowles, M. S. (1970). What is Andragogy? *The Modern Practice of Adult Education. Pedagogy to Andragogy*, 40–59. http://www.hospitalist.cumc.columbia.edu/downloads/cc4_articles/EducationTheory/Andragogy.pdf.

Lupton, G. T. (2021). Self-identified professional development needs of Virginia career and technical education teachers [Virginia Tech]. https://vtechworks.lib.vt.edu/handle/10919/102411?show=full.

Ministry of Education Sector Working Group (2019). *Medium term expenditure framework 2020/21-2022/23- 2019 education sector report*. https://treasury.go.ke/component/jdownloads/send/211-sector-reports/1497-education-sector-mtef-2021-2023-report-final.html?option=com_jdownloads.

Misra, P. K. (2011). VET teachers in Europe: Policies, practices and challenges. *Journal of Vocational Education & Training*, *63*(1), 27–45. https://doi.org/10.1080/13636820.2011.552732.

MoE-Directorate of Technical Education (2020). Staff and student returns may-august 2020. https://www.education.go.ke/index.php/downloads/file/818-facts-and-figures-october-2020-1.

Naliakamukhale, P., & Hong, Z. (2017). Towards improvement of student learning outcomes: An assessment of the professional development needs of lecturers at Kenyan universities. *Journal of Education and Practice*, *8*(12), 151–158. https://eric.ed.gov/.

Neumann, K., Kind, V., & Harms, U. (2019). Probing the amalgam: The relationship between science teachers' content, pedagogical and pedagogical content knowledge. *International Journal of Science Education*, *41*(7), 847–861. https://doi.org/10.1080/09500693.2018.1497217.

OECD (2013). *TALIS 2013 Technical Report*. OECD. https://www.oecd.org/education/school/TALIS-technical-report-2013.pdf.

OECD (2018). *TALIS 2018 Technical Report*. OECD. https://www.oecd.org/education/talis/TALIS_2018_Technical_Report.pdf.

OECD (2019). Attracting and effectively preparing candidates. In *TALIS 2018 results (volume I) teachers and school leaders as lifelong learners*. OECD. https://doi.org/10.1787/dd6dd4bc-en.

Oketch, M. (2014). *Education policy, vocational training, and the youth in Sub-Saharan Africa*. World Institute for Development Economic Research (UNU-WIDER). Working Paper Series: UNU-WIDER Research Paper WP2014/069, 2014, 18 Pp., March, 18.

Oroni, W. G. C. (2012). *A comparison of technical education teachers' competencies: A study of Moi University and Kenya technical teachers college graduates in technical institutions in Kenya*. University of Nairobi.

Panadero, E., Garcia, D., & Fraile, J. (2018). Self-assessment for learning in vocational education and training. In S. McGrath, M. Mulder, J. Papier, & R. Suart (Eds.), *Handbook of vocational education and training: Developments in the changing world of work* (pp. 1–12). Springer International Publishing. https://www.researchgate.net/profile/Ernesto-Panadero/publication.

Rawkins, C. (2018). Joint ILO-UNESCO committee of experts on the application of the recommendations concerning teaching personnel (CEART) A global overview of TVET teaching and training: Current issues, trends and recommendations. https://www.ilo.org/wcmsp5/groups/public/—ed_dialogue/—sector/documents/meetingdocument/wcms_675275.pdf.

Rojewski, J. W., Choi, I., Hill, J. R., Kwon, S. J., Choi, J., Kim, E., & McCauley, L. (2021). Perceived professional competence of clinical research coordinators. *Journal of Clinical and Translational Science*, *5*(1), e76. https://doi.org/10.1017/cts.2020.558.

Saldaña, J. (2013). *The coding manual for qualitative researchers*. SAGE.

Schaffar, B. (2019). Svårigheter i att definiera begreppet kompetens. *Nordic Journal of Vocational Education and Training*, *9*(1), 111–128. https://doi.org/10.3384/njvet.2242-458X.1991111.

Schmid, M., Brianza, E., & Petko, D. (2021). Self-reported technological pedagogical content knowledge (TPACK) of pre-service teachers in relation to digital technology use in lesson plans. *Computers in Human Behavior*, *115*, 106586. https://doi.org/10.1016/J.CHB.2020.106586.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, *15*(2), 4–14. https://doi.org/10.3102/0013189X015002004.

Sifuna, D. N. (2020). The dilemma of technical and vocational education (TVET) in Kenya. *Journal of Popular Education in Africa*, *4*(12), 4–22. http://www.jopea.org/index.php/current-issue.

Sigrid Blömeke (2017). Modelling teachers' professional competence as a multi-dimensional construct. In S. Guerriero (Ed.), *Pedagogical knowledge and the changing nature of the teaching profession* (pp. 119–135). OECD. https://doi.org/10.1787/9789264270695-7-en.

UNESCO-UNEVOC (2018). *TVET country profiles: Kenya*. https://unevoc.unesco.org/wtdb/worldtvetdatabase_ken_en.pdf.

van Loon, M. H. (2018). Self-assessment and self-reflection to measure and improve self-regulated learning in the workplace. In *Handbook of vocational education and training* (pp. 1–20). Springer International Publishing. https://doi.org/10.1007/978-3-319-49789-1_88-1.

Zell, E., & Krizan, Z. (2014). Do people have insight into their abilities? A metasynthesis. *Perspectives on Psychological Science*, *9*(2), 111–125. https://doi.org/10.1177/1745691613518075.