

University of Groningen

## Perceived effects of competency-based training on the acquisition of professional skills

Boahin, Peter; Hofman, W. H. Adriaan

*Published in:*  
International Journal of Educational Development

*DOI:*  
[10.1016/j.ijedudev.2013.11.003](https://doi.org/10.1016/j.ijedudev.2013.11.003)

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2014

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*  
Boahin, P., & Hofman, W. H. A. (2014). Perceived effects of competency-based training on the acquisition of professional skills. *International Journal of Educational Development*, 36, 81-89.  
<https://doi.org/10.1016/j.ijedudev.2013.11.003>

### Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

*Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.*



# Perceived effects of competency-based training on the acquisition of professional skills



Peter Boahin<sup>a,b</sup>, W.H. Adriaan Hofman<sup>b,\*</sup>

<sup>a</sup> National Board for Professional and Technician Examinations (NABPTEx), Ghana

<sup>b</sup> University of Groningen, The Netherlands

## ARTICLE INFO

### Keywords:

Competency-based training  
Implementation  
Training  
Assessment  
Skills

## ABSTRACT

The need to develop key competencies to meet the changing demands of industry has made the introduction of competency-based training (CBT) reforms in the Vocational Education and Training (VET) system a priority in many countries. This article explores the views of polytechnic students in Ghana on the effect of CBT on the acquisition of competencies to perform professional tasks. The results show that the modular structure has indirect effects on the acquisition of skills through quality teaching and feedback. It is argued that assessment in CBT needs to move away from emphasising more on routine tasks towards the development of broad sets of generic skills and adaptable workforce.

© 2013 Elsevier Ltd. All rights reserved.

## 1. Introduction

New technologies and globalisation have compelled the labour market and employers not only to look for people who possess specialised knowledge and skills but also capable of adapting to changing situations. This development requires changes in the roles of teachers and learners in the instructional process. As teachers move away from the traditional “chalk to talk” model to become facilitators, advisers or coaches (Mitchel, 2003), learning approaches in the training programmes need to become more student-centred, active and exploratory (Swales and Roodhouse, 2004; Cremers et al., 2005). However, in most developing countries the shift from ‘teacher centred’ ‘chalk to talk’ model to ‘student centred’ approach has had implications in several areas in term of pedagogy, assessment and curriculum (Schweisfurth, 2011, cited in Thompson, 2013). These consequences are particularly related to the societal structure of these countries, containing class layers (public & private schools) and social groupings (urban & rural settings). Therefore, the replacement of the ‘teacher-centred’ by the ‘learner-centred’ model needs to be specifically adapted to the local socio-economic conditions and cultural realities of the classroom contexts in these countries.

A key approach in VET system designed to facilitate the required changes and improves the relevance of training and quality of skills is competency-based training (CBT). The aim of CBT is to ensure that the skills delivered by the training systems match the skills needed by industry in the immediate and longer term

(Keating, 2008). Despite its inherent challenges indicated in the literature (Mulder, 2004; Hellwig, 2006; Smith, 2010), CBT has been adopted as central policy strategy among many nations to re-structure their VET systems and develop competences required in the labour market. The main objectives in implementing this innovation have been to reduce unemployment rate, increase productivity and to achieve international competitiveness (Argüelles and Gonczi, 2000; Callan and Ashworth, 2004). Furthermore, CBT is an outcome-based approach and considered as a major driver and motivator of the learning perspective in which the role of the individual is rated higher than that of the teachers, government or other stakeholders (Reuling, 2002). Therefore, CBT has both a didactical dimension (competences and qualifications) and a political and social component (pathways and opportunities for learning) (Deissinger and Hellwig, 2011). Countries such as the United States of America (USA), the United Kingdom (UK), Australia and the Netherlands have had several decades of experience in the implementation of CBT in their VET systems. Australia for instance, had to upgrade the skills of its workforce in order to undertake industrial restructuring and remain competitive with the other OECD countries (Keating, 2008). Similarly, in the UK the changing nature of work and the higher skills requirements necessitated for national skills standards in order to ensure labour mobility (Matlay and Addis, 2002).

Like other countries in Africa, Ghana has experienced high levels of economic growth for more than 20 years in the range of 4–5%. However, these growth rates have not been reflected by the amount of jobs creation, employment opportunities or poverty reduction among the youth (King, 2009). This argument is based on the claim that VET is built on two key productivist assumptions: (1) training leads to productivity, which results in economic growth,

\* Corresponding author. Tel.: +31 503636792.

E-mail address: [w.h.a.hofman@rug.nl](mailto:w.h.a.hofman@rug.nl) (W.H. Adriaan Hofman).

(2) skills lead to employability, which results in jobs (Anderson 2009, cited in McGrath, 2012). The introduction of CBT in Ghanaian polytechnics aims to bridge the skill deficiencies between the study programmes and the needs of industry so as to create jobs and reduce graduate unemployment among the youth (COTVET, 2006). Upgraded to the tertiary status in 1992, the polytechnics education in Ghana aims to provide career – focused education and relevant skill training programmes to meet the changing needs of the students, industry and society. Entry into the polytechnics requires the completion of the general Senior High school (SHS)/ Senior High Technical School (SHTS) or the general technical and craft courses at Technical and Vocational Institutes (TVIs), which prepare students for the Higher National Diploma (HND). Furthermore, in some disciplines, HND holders can continue their study for nearly two years to obtain the Bachelor of Technology (B. Tech) degree, which is the highest obtainable national qualification in the TVET in Ghana. Both the HND and the B. Tech degrees correspond with the international standard classification of education (ISCED) levels 6 and 7 respectively because the programmes are specifically focused on the acquisition of intermediate or advanced professional knowledge, skills and competencies with a strong practical component.

However, over the last decade, the polytechnic institutions have not been successful in producing middle-level personnel due to reasons such as theory-based curricula and assessment, inadequate equipment and training materials, inefficient schemes of industrial attachment and apprenticeship training and weak linkage between polytechnics institutions and the industry. All these factors make it difficult for graduates to obtain placement in the job market (JICA, 2001). In a labour market study about the performance of tertiary graduates including those of the polytechnics in Ghana, Boateng and Sarpong (2002) observed from the employers that most of the graduates lacked basic skills to complete simple routine assignment. As a result, some employers take prospective employees through longer orientation and probation schemes after which the best performing candidates are selected. A tracer study on the performance of polytechnic graduates in the Ghanaian labour market revealed that almost half of the new employees (43.8%) took additional professional training courses either to improve their skills and knowledge or to learn new competencies which they had not been taught during their training (Boahin et al., 2010). Inadequate practical training in the polytechnics has caused an emerging trend towards a large percentage of students (65%) pursuing Business-related programmes to the neglect of the Engineering and Applied Sciences and Technology (Boahin and Hofman, 2012).

Given these realities, the Council for Technical and Vocational Education and Training (COTVET) in collaboration with donor agencies such as the Canadian Development Agency (CIDA), JICA and the Netherlands Organisation for International cooperation in Higher Education (NUFFIC) introduced an industry-driven CBT in the TVET systems in Ghana. This study is based on the NUFFIC CBT project in the Ghanaian polytechnics aimed at the revision of curricula in five disciplines; Agricultural Engineering, Fashion Design Building Technology, Civil Engineering and Automobile Engineering. The goal is threefold: to improve the quality and relevance of TVET by equipping graduates with the required workplace and professional skills, promote a stronger, demand-driven working relationship with the employers and reduce the graduate unemployment (NFP-NPT, Newsletter, 2005).

As an industry-focused and demand-driven form of training, CBT curriculum development requires considerable input from industry to become more relevant to the workplace requirements. The curriculum re-design involves consultation with industries to find out (1) an overview of the existing jobs, usually referred to as job profiling (2) identify the professional tasks (job descriptions),

(3) the tasks and competencies required to perform the professional tasks (core tasks) and (4) formulation of learning task (course blocks). Each learning task contains a lecture, practical training, self-learning/study, a personal development plan and a complete assessment procedure ranging from simple to complex tasks for each job description. After an expert review, the final document is accredited as a curriculum blue-print or set of competency standards for an occupation, which also forms the basis for the training delivery and assessment procedures (Eggink and Van Den Werf, 2006; CBT Assessment in Ghana, 2007). After implementing CBT for a number of years, this study attempts to evaluate the extent to which the polytechnics in Ghana utilise CBT features such as modular structure, industry involvement, assessment and feedback in their study programmes to assist students to acquire the necessary competencies to perform professional tasks. These features were selected because they are closely linked to the development of professional competencies and entrepreneurial skills for workplace performance. Modularisation of courses is believed to expose students to different academic traditions of pedagogy, experiences and assessment practices which promote the development of professional competencies for successful employment (Hennessy et al., 2010). Assessment is central to modular courses that are driven by CBT to ensure mastery of each task before progressing to a more advanced one for which the initial module is pre-requisite knowledge. CBT assessment is linked with industry because it must be conducted in the work environment or in simulated conditions and learners' performances must be measured against the industry competency standards. Crebert et al. (2004) found that industry-based learning, internship and practicum improved the generic skills of students in different disciplines. Furthermore adequate practice and feedback are essential in modular courses to assist students to progress towards their desired goals.

The central research question for the study is: To what extent do features such as modular structure, involvement of industry, and assessment practices in combination with the quality of teachers and feedback influence the acquisition of professional skills?

## 2. CBT and the acquisition of professional competencies

As an evolving concept, the term 'competence' (as in the British context) or 'competency' (as in the Australian context) continues to be developed especially in the fields of higher education, professions and nations depending on their institutional structures and labour processes. However, Australia and the UK are quite similar in both their method of implementation and the behaviouristic stance adopted towards CBT (Biemans et al., 2004). In the UK, competence refers to the actions, behaviour or outputs which reflect skilled performance (Horton, 2000), while in USA, competency is defined in terms of underlying characteristics that enable an individual to achieve outstanding performance (McGuire and Garavan, 2001; Dubois and Rothwell, 2004). This means that in the UK, the reference point for competence is not labour but output, whereas in the USA, the focus is more on the potential and cognitive perspective of learning rather than demonstrated proficiency.

In Europe, competence is perceived as the capacity of individuals to perform specific tasks and roles to the expected standards in a given context or profession (Biemans et al., 2004; Mulder et al., 2006). Thus, it involves the integration of practical and theoretical knowledge, as well as personal and social qualities within a broadly defined occupational field (Brockmann et al., 2008). In Ghana, competence is conceptualised as the capacity of an individual to perform professional tasks to a specified standard (COTVET, 2006). From the foregoing definitions, the term 'competence' or 'competency' relates to the ability to perform activities or

tasks in a given occupation to the required standards. Across all the definitions, competency is also expressed as a function of three components namely; skills, knowledge and attitudes or behaviours that enable successful job performance. Therefore, CBT may be viewed as an approach to VET in which skills, knowledge, attitudes and values are specified in order to define, steer and achieve competence standards. It is a training that focuses on the acquisition of the competencies necessary to perform professional tasks or meet the standards specified in the industry (Eggink and Van Den Werf, 2006). This implies that CBT is performance-and standards-based and involves pre-specification of learning outcomes in a realistic workplace practices, promotes self-paced learning and uses modularised curriculum materials (Deisinger and Hellwig, 2011). However, the rapid pace of technological change and high labour mobility requires workers to exhibit a broader range of skills, professional competencies and attitudes to continually adapt and transfer skills and knowledge in different contexts. Thus, industries are in constant search of employees who are capable of combining technical skills with professional competencies in innovative and productive ways for effective participation in the emerging patterns of work and organisation (Mitchell et al., 2006; Gibb and Curtain, 2004; Brown et al., 2008). These professional competencies refer to occupational tasks and generic competencies such as creativity, information communication and technology (ICT), communication, problem-solving, organisational skills, proactive, teamwork, adaptability, gathering and analysing information. Essential to all occupations, these competencies are embedded within the competency standards and modules in all learning programmes to equip individuals to function effectively in a wide range of social settings, professions and workplaces and also serve as the pre-requisites for self-employment and life-long learning (Guthrie, 2009; Kouwenhoven, 2011).

The issue of professional competencies are particularly crucial in Ghana where most of the jobs on offer for tertiary graduates are mainly short-term contracts, part-time and casual hours because most graduates do not possess sufficiently the generic competencies required to perform well in a profession (Boahin et al., 2010). Feedback from employers' surveys indicates that tertiary graduates are particularly weak in professional competencies such as problem-solving, organisational skills, ICT, communication and teamwork (World Bank, 2009). At the same time, several studies indicate that teachers do not integrate these competencies into learning and assessment strategies (NCTVET, 2006; NCVET, 2003; Barrie, 2005). It is therefore crucial to investigate the extent to which these competencies are developed in CBT implementation to assist graduates to gain employment and maintain their placements in the workforce.

### 3. Differences between CBT and traditional training methods

The methods of CBT are regarded as suitable alternative to the traditional forms of training for several reasons. In CBT, training is divided into learnable units or elements of competence targeted towards specific skill development. Traditional training is often generic, and not so much focused on bridging specific skill gaps to improve job performance. Furthermore, CBT training is flexible, not time-based and learning is student-centred, where learners progress through modules individually or in small groups at their own pace while the role of the instructor is that of a coach, mentor or facilitator (Eggink and Van Den Werf, 2006). In the traditional programmes, training is centred on subject contents, and the instruction is time-based and teacher-centred, where the role of the instructor is typically restricted to that of the expert, while class size is large and the teaching style is lecture-oriented.

CBT is organised in modules, performance-based, practically-oriented, and theory is taught mainly as underpinning knowledge usually at a workshop and workplace or in a simulated environment. Many traditional programmes merely focus on the acquisition of large amounts of knowledge, with a small emphasis on structured practical activities often performed simultaneously by all class members within a classroom setting. Assessment in the traditional training is primarily based on performance of written test and practical assignment and achievement is compared with other students taking the course (norm-referenced). In CBT, assessment is geared towards clearly specified criteria or standards in the industry and the outcome of the training is measured against a single performance criterion (criterion-referenced) which can either be demonstrated as competent (pass) or not yet competent (fail).

In the traditional training, there is no structured system of recognition of prior learning (RPL) and that credit for prior learning is open to interpretation. In CBT however, trainees who already possess special skills through previous formal training, work or life experience can receive credits for or exemption from modules which contain those specific competencies. CBT is also customised to meet the skill development needs of an organisation and its employees than the traditional training that is often generic in nature. In short, CBT allows for a more precise match between education/training and on-the-job needs (Cremers et al., 2005).

### 4. Utilising modular structure, industry involvement, assessment practices, quality of teachers and feedback in CBT

#### 4.1. Modular structure

Modularisation of courses involves the packaging of course content, either theory or practical, into shorter, logically self-contained units. The association of modular courses with CBT has been promoted by earlier behavioural approaches to CBT adopted by countries such as Australia and UK. As a result, modularisation has been a key element in the implementation of CBT in the VET systems of many countries with the aim of producing graduates with specific competencies. Furthermore, it is to ensure success and mastery of each task before progressing to a more advanced one for which the initial module is pre-requisite knowledge.

Shorter, self-contained units are very useful in meeting the needs of industry in a relatively shorter period as modules can be designed to provide specific training in skills relating to specific occupations or industries rather than to be part of a long term-training for broader professional development (Cornford, 1997). This is particularly useful in VET system which is usually driven by global economics, industry restructuring and changes in science and technology (Curtain, 2004). It also facilitates the recognition of prior learning and credit transfer as the course content can easily be assessed and credited. Although other non-CBT courses are organised in modules to enhance the teacher's work and to increase opportunities for interdisciplinary study (Hennessy et al., 2010), it is considered a special feature of CBT as it represents a certifiable part of a job that can be studied separately to acquire the specific competencies required for a job.

In Ghana, the CBT study programmes in the polytechnics have been organised into modules and each module contains specific competencies required for a job. However, to acquire a national certification (Higher National Diploma) requires the completion of all modules within the specific skill area, along with the related support subjects (NCTVET, 2006; COTVET, 2006). Learners' rate of progress through the programme is determined by demonstrated competency rather than time or course completion. However, modularisation of courses particularly in the behavioural approaches of CBT has the potential to fragment units of



knowledge because of its focus on output without substantial knowledge and generic skills (Cornford, 1997; Wesselink, 2010). Evidence and complaints from the students of modular courses in the polytechnics show that essential and pre-requisite skills are often not properly learnt from previous modules for success in current modules due to inadequate practice or revision of previous modules (Boahin and Hofman, 2012). This means that students need to be taught learning-to-learn strategies to ensure mastery of separate modules, construct links between previous and current modules and to achieve professional competencies for effective workplace practice.

#### 4.2. Involvement of industry

Industry's involvement is critical to the relevance and success of CBT in all phases of the training programme; including the design of the competency-standards, development and review of curricula and assessment strategies, apprenticeship training, monitoring and evaluation of training courses. As the study focuses on the perceptions of student, the involvement of industry would be limited to students' industrial attachment or internship. On-the-job training, internship or industrial attachment involves training on the job during normal operational conditions, and on-site training, which is conducted away from the work process (Australian National Training Authority, 2003). It affords the trainees the opportunity to understand what, how and why they are learning in the classroom. In addition to the acquisition of technical skills and transfer of learning, training at the workplace enables learners to acquire other generic skills such as communication, teamwork, problem-solving and adaptability skills that are equally required to perform professional tasks (Waterhouse and Virgona, 2004; Crebert et al., 2004).

In Ghana both training institutions and industry collaborate to ensure students' placement, supervision and assessment during the industrial attachment. Students' attachment period takes place during the end of the second semester of the first and second years of study, usually in the long vacation. The attachment duration ranges from 6 to 8 weeks (a total of 12–16 weeks) in a study programme and attracts a total of four (4) credit hours per period. After each attachment period, the student is assessed by the industry or organisation and the polytechnics together with the students' own report, which are scored as part of the semester's assessment. However, the involvement of industry in CBT implementation in Ghana is a contested issue. A study by JICA (2008) for instance, found no evidence of industry involvement in the implementation of CBT in the Technical and Vocational Education and Training (TVET) study programmes. Other studies in the polytechnics show that mentoring students on internship programmes is the significant role of industry's participation in the implementation of CBT in Ghana (Boahin and Hofman, 2012).

#### 4.3. Assessment practices

Competency-Based Assessment (CBA) is defined as a process of judging competency against the prescribed standards of performance (Argüelles and Gonczi, 2000). It focuses on the relevant knowledge, skills and attitudes of a professional task and occurs in a real, authentic or simulated environment. In CBT, assessment is central in modular courses to provide information about the discrepancy between the current status of performance and the desired learning goals. Feedback from assessment offers strategies to understand a task, empower students to self-regulate their learning to attain mastery (Black and William, 1998; Harlen and Crick, 2003).

In Ghana, the practical component of assessment covers 70% of the total marks of the final grading and it includes structured

industrial attachment, institutional practical, field and project work. The theory segment covers 30% marks of the final grade and includes presentations, case studies, assignments, course work, tests and end of semester examinations (NABPTEX, 2007). Performance criteria include attendance, participation, teamwork, assignments, research work, quizzes and presentations. The assessment of practical component is particularly based on the demonstration of skills, preferably at the work environment, or simulations on the job conditions and students are assessed as 'competent' or 'not yet competent' against the industry competency standards. However, assessment against pre-defined standards tends to restrict assessors' judgement on competencies related to innovation and future operations at the workplace (Guthrie, 2009; Smith, 2010). Therefore, effective development of skills or expertise cannot be judged from one-shot assessment task at the end of each module but requires consistent performance and feedback from multiple assessment or observations by the assessor over a relatively long period of time. Successful performance therefore, could be judged from the ability to demonstrate skills, the underlying principles and to translate it into effective practice. The use of well-structured observation, check-lists and rating scales in the assessment process are also criticised as labour-intensive and time-consuming exercise (Biemans et al., 2004; Hellwig, 2006; Boahin and Hofman, 2012). It is for these concerns that Smith (2010) expressed the need for teachers and industry personnel to acquire high-level educational skills and qualifications for proper delivery of CBT.

#### 4.4. Quality of teachers and feedback

The concept of quality teaching is both complex and contested as it is not easy to identify what constitutes a good quality teaching or define suitable methods to evaluate and develop the teaching workforce (Peng et al., 2014). However, recent studies identify three broad areas as teaching variables that are positively associated with students' achievement. These are teacher professional competence and related beliefs and attitudes, teacher classroom practice and professional activities and classroom and school level environment (Scheerrens 2007 and OECD 2010, cited in Peng et al., 2014).

Like any other teaching innovation, the success of CBT implementation also depends on the quality of teachers. This is because CBT is built on the philosophy that almost all learners can learn equally well if they receive high quality of instructors and sufficient time (NCTVET, 2006; Smith, 2010). In the self-paced training, teachers in CBT need to change their traditional role as information-provider to become facilitator, coach, assessor, educational developer and resource person (Gauld and Miller, 2004; Tigelaar et al., 2004; Wesselink, 2010). This means that students also require immediate feedback, periodic promptings, and repeated reinforcement at every stage in the learning process to close the gap between current understanding or performance and the desired goal (NCTVET, 2006). Feedback particularly needs to be provided about (1) the task, (2) the process used to complete the task, (3) self-regulation and finally (4) oneself as a person, usually in the form of compliments, grades or praises (Hattie and Timperley, 2007). In such environment, the students become more responsible for their own learning and progress as they demonstrate self-regulatory attributes like self-monitoring, self-evaluation, self-assessment and self-teaching (Hattie, 2009). However, given the intense concentration of the content in the CBT modules, teachers often do not have sufficient time to support the students properly during the training sessions, for example by offering the opportunity for re-submission of task, feedback and coaching. (Boahin and Hofman, 2012). However, feedback gained from formative assessment is absolutely essential in effective skill

training and the development of expertise (Cornford, 1997). It is therefore crucial for teachers to consider the nature of feedback, the timing, and how students interpret feedback information as the key to develop positive attitudes towards skill training.

## 5. Model for CBT implementation in the Ghanaian polytechnics

The literature reviewed demonstrates that there is a wide range of factors which influence the acquisition of competencies required to perform professional tasks. Fig. 1 presents the framework which guides the current research. In this framework, it is proposed that achievement of competencies for effective work practice is influenced essentially by modular structure, involvement of industry and assessment practices mediated by the quality of teachers and feedback.

As a module represents a certifiable part of a job that can be studied separately to acquire the specific competencies required for a job (Hennessy et al., 2010), we assume that the use of modules would have an indirect effect on the acquisition of required competencies through quality of teachers and feedback. This premise is based on the fact that learning modules or materials do not function in isolation to enhance learning outcomes, but are dependent on and need to be compatible with teachers' pedagogical practices, professional values and language proficiency(ies) (Tikly and Barrett (2011). Studies on authentic assessment show that when students' assessment is in line with their future professional practice, they are encouraged to study more intensively and thereby develop more professional competencies (Gulikers, 2006). We hypothesise that assessment would have an indirect effect on the acquisition of required competencies through periodic promptings and task-oriented feedback. Industry-based learning, internship and practicum are said to assist learners to acquire both technical and other professional skills required by employers (Waterhouse and Virgona, 2004; Crebert et al., 2004). We also expect that, through workplace learning and internship, industry may assume a direct or an indirect effect on the acquisition of competencies. As the focus of CBT is student-centred, self-paced and mastery learning, providing timely feedback with periodic promptings and repeated reinforcement on students' performances is expected to have a direct effect on the acquisition of required competencies needed to perform professional tasks (NCTVET, 2006).

## 6. Data and method

### 6.1. Design

This study utilised a descriptive survey design to evaluate the perceived effect of CBT on the acquisition of professional skills in Ghanaian polytechnics. A combination of questionnaire, interview and observation were conducted on students and industry personnel. The study focused primarily on the perceptions of students because they are the focal point of competence

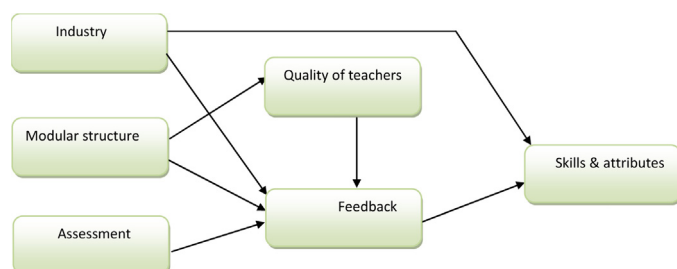


Fig. 1. A research model for the implementation of CBT in Ghanaian Polytechnics.

development and placed higher than the teachers, government and other stakeholders because they are expected to take charge of their studies and learn at their own pace in preparation for future workplace culture (Reuling, 2002; Jonnaert et al., 2007; Wesselink, 2010). Furthermore, students perceptions tend to drive their learning (Lizzio and Wilson, 2004) and that looking through their viewpoints could provide useful information about the quality of the teaching and learning process.

### 6.2. Participants

In a cross-sectional design, participants were selected from each year group of students in all the ten (10) polytechnics through dimensional sampling. The aim was to obtain a broad range of views of students from diverse background and experiences in the CBT programme. The dimension considered in the sampling procedure were (1) participants in the baseline study conducted in 2008, (2) non-participants in the baseline study (3) students who graduated from the SHS/SHTS and TVI's, or who had received previous post-secondary education. A sample of 500 students was drawn from a population of 1103 students in five CBT programmes. Out of this number, 316 students (63.2%) participated in the study. The breakdown of the participants from the five programmes was Agricultural Engineering (124) 38.9% from four polytechnics, Building Technology (61) 19.7% from two polytechnics, Civil Engineering (68) 21.5% from two polytechnics, Automobile Engineering (34) 10.7%, and Fashion Design (29) 9.1% each from one polytechnic. The students were made up of 84.6% males and 15.4% females. Among the participants, 66.8% had entered the polytechnic education through SHS or SHTS, 17.9% graduated from TVI and 15% had received additional post-secondary education. About 51.5% of the students was drawn from the final year group who had also participated in the baseline study, 28.8% from the second year and 19.7% from the first year group most of whom had not participated in the baseline study. In each polytechnic, one of these study programmes was offered as CBT and all the CBT programmes started in September 2006.

### 6.3. Instrumentation

A questionnaire containing 63 items was developed based on the key dimensions of CBT in the study to elicit views and opinions on the perceived effects of CBT on acquisition of professional skills. The reliability of the variable scales was determined, and the Cronbach's alpha scores were found to be moderately to highly reliable (range .66 to .84) except for industry involvement which was observed to be unsatisfactory (.44). The industry dimension was nevertheless included in the analysis because of its crucial role in CBT although the outcome must be interpreted with caution. To explore whether the variables were uni-dimensional, a factor analysis was conducted on each dimension and all scales proved to be uni-dimensional.

#### 6.3.1. Independent variables

The modular structure dimension refers to a logically self-contained unit of study which consists of knowledge, skill and work-related activity. It consists of seven items and rated on a four-point scale ranging from strongly agree to strongly disagree. Examples of items are 'Students progress from one learning module to another after mastering a specific skill' and 'Assessment of learning modules involve both written and practical examinations'. The scale anchors have been defined as: 4 = strongly agree to 1 = strongly disagree. The internal consistency of the 'modular structure' factor is .66.

Quality of teachers refers to teacher expertise in both technical and pedagogical skills in the delivery of CBT. Examples are

'Teachers possess adequate knowledge of the subject matter and are sufficiently skilled in the lesson delivery' and 'Students receive adequate learning support from the teachers'. Feedback relates to the information provided by the teachers regarding the students' performances in the context of their learning. Related items include 'Feedback provides information on the process of completing a task'. 'Feedback information assists students to learn on their own pace'. The Cronbach's alpha for the quality of teachers and feedback dimensions are .71 and .69 respectively.

Involvement of industry measures the role of the industry personnel in students' industrial attachment programmes in CBT. Examples are 'Industry staff supervise and mentor students during the attachment'. 'Industry staff assess the students' projects'. Although, its internal consistency was unsatisfactory ( $\alpha = .44$ ), the decision to include the industry dimension in the analysis is based on the crucial role of industry in the CBT implementation. However, the outcomes with regard to this dimension should be viewed with caution.

Assessment and grading refers to the process of judging students' performances against the desired standards. It consists of seven items, and covers the mode, focus and personnel involved in assessment, assessment criteria and grading format. Examples of the items are 'Assessment is based on demonstration of skills' and 'Assessment takes place in a workshop or created environment similar to the workplace'. The internal consistency coefficient of the assessment and grading factor was .69..

### 6.3.2. Dependent variable: acquisition of professional skills

The acquisition of professional skills constitutes the dependent variable in the study and refers to generic competencies required to perform professional tasks. These skills include ICT, creativity, communication, problem-solving, organisational, teamwork, proactive and adaptability. These skills were assessed by nine items rated on a four-point scale ranging from 4 = very effective to 1 = not at all effective. Examples of the items which addressed these specific skills included adaptability skills; *Ability to transfer skills and knowledge in a new situation*, and teamwork skills; *ability to work with people of different ages, race or gender*. The internal consistency of the professional skills' factor is good ( $\alpha = .84$ ).

### 6.4. Procedure

Given the poor internet facilities in the polytechnics, the questionnaires were personally administered and retrieved through a contact person at each polytechnic, usually the Head of Department (HOD). The first visit to the polytechnics was used to administer the questionnaire, which were retrieved in the subsequent visits. Both the HODs and the students of the study programmes under review were briefed on the purpose of the study, instructions for completing the items and assurance of confidentiality. In order to enhance the response rate of the questionnaire, the HODs received reminders via telephone and e-mail.

To validate the responses from the questionnaire technique, we observed the relevant learning and assessment processes in the five CBT programmes in all the ten polytechnics to obtain a true impression of the training sessions in the polytechnics. This involved participant observation in the training delivery using unstructured interviews with the students. A variety of industries and organisations where the students had completed their internships were also visited to obtain a more in-depth view about industry involvement in the CBT programme. To this end, semi-structured interviews of between 45 and 60 min were conducted with personnel working in several industries and organisations, such as the Cocoa processing company, the Automobile and the Road and Building Construction industries, Ghana Highway Authority,

Ghana Water Company, Food processing company and some irrigation projects. The interviews explored the relationship between industry and the polytechnics in the area of lecturing, mentoring students in their internships, assessment of projects and development of CBT curriculum. All interviews were tape-recorded and later transcribed in full. The insight gained from direct observation and interview techniques were used to triangulate and corroborate the results that emerged from the study.

## 7. Results

### 7.1. Analysis of the model

We tested the research model using structural equation modelling (LISREL 8.52 Jöreskog and Sörbom, 2002). Fig. 2 shows that the use of the modular structure has a substantially significant direct effect on the quality of teachers and a significantly indirect effect through the quality of teachers ( $0.54 \times 0.20 = 0.11$ ) on the acquisition of professional skills. These findings seem to imply that learning modules promote quality of teaching and skills acquisition. Furthermore, they assist teachers to provide effective feedback on the students' learning progress ( $\beta: 0.32$ ). In line with the formulated hypothesis, the quality of teachers also has a strong significant effect on the effectiveness of feedback because effective teaching partly requires the gathering of comprehensive information to be able to make the right decisions about the learners. We posited an indirect effect of the quality of teachers on the acquisition of professional skills through feedback. The results showed a moderate direct effect of the quality of teachers ( $\beta: 0.20$ ) on the acquisition of professional skills and an indirect effect through feedback ( $\beta: 0.40$ ). Our expectation concerning a significant effect of feedback on acquisition of professional skills was confirmed. Even though the effect was weak ( $\beta: 0.11$ ). The results suggest that teachers do not often ensure adequate practice, feedback and coaching in the learning process to assist students to acquire professional skills.

Contrary to our expectations, we observed no effects of industry involvement in the CBT programme on the acquisition of professional skills, which implies that industrial attachment in the CBT programmes in the polytechnics does not enhance the acquisition of professional skills. Similarly, we did not establish any effect of assessment on acquisition of professional skills, implying that assessment practices in the modular courses do not assist students to acquire skills needed to perform professional task.

### 7.2. Interview with personnel from industry

A number of questions were asked from industry personnel to find out the extent of industry involvement in CBT programmes in the polytechnics. On the issue of curriculum development, about 34.7% indicated their involvement in identifying essential job skills and competencies required in a specific profession. About 77% of

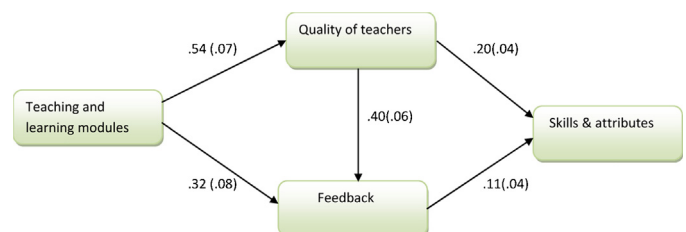


Fig. 2. Standardised effects of observed variables (beta coefficients and standard errors).

the personnel said that they offered placement, supervised and mentored students on internship. It was further revealed that about 65% of the applicants did not obtain placement due to limited facilities, compelling students to accept placements which had little or no relevance to their study programmes. On the issue of supervision, it was revealed that internship programme in the polytechnics were not well-structured as some of the interns never received supervision from their own institutions and that the polytechnic authorities invariably relied on assessment from the industry or students' own reports. About 61.6% of the personnel further indicated that they provided lectures and assessed the final projects of students in their study.

### 7.3. Observation of training and assessment processes

In many cases, courses were organised in modules and students proceeded through the modules individually or in groups in a self-paced manner. Progression through the modules occurred after mastering specific competencies. However, students' prior learning was not recognised in the training, compelling students to repeat the same module for competencies they had already achieved. There was considerable variation in the assessment practices across the five disciplines due probably to differences in the structure of the study programmes. Although students' achievement was graded, it was measured against clearly specified criteria (criterion-referenced) and emphasised more on demonstration of skills as compared with the underpinning knowledge.

Teachers spent less time in the 'up-front teaching' method and more time in coaching, mentoring, providing periodic promptings and feedback on students' learning. In two polytechnics, experts from Automobile industry and Agriculture Extension delivered lessons and assessed students' projects in their respective fields. On a number of occasions, students worked in teams, organised materials sequentially, used ICT and communicated effectively in the training environment. However, the training seemed to prepare students for specific competencies required to handle routine tasks and work roles instead of providing opportunity to explore their own initiatives. Therefore, innovative work practices that emphasise on critical thinking, problem-solving, creativity, proactive and adaptability skills were not encouraged in the training sessions.

## 8. Discussion

This study has explored the perceptions of students regarding the effect of modular structure, industry involvement, assessment practices, quality of teachers and feedback on the acquisition of professional skills. Modular structure was found to have indirect effects on the acquisition of professional skills through quality of teachers and feedback. This implies that appropriate teaching and learning modules enhance quality of teaching, which in turn leads to acquisition of required competencies (Bell and Wade, 1993; Hennessy et al., 2010). The results corroborate the assertion made by NCTVET, 2006 that students need to be given repeated reinforcement at every stage of the module until they master the required competencies for them to move on to a more advanced one. However, students, selection of modules need to be regulated in order to achieve coherence in academic discourse and competencies required in the industry (Jenkins and Walker, 1994; Hennessy et al., 2010). Designing modules into core, compulsory and pre-requisites for entry into advanced modules would restrict students from selecting particular modules that are relatively easy to complete, or avoid a particular type of assessment or related competencies which may ultimately be crucial for employment prospects.

Against our expectations, we found a direct relationship between the quality of teachers and the acquisition of skills with an indirect effect through feedback. These results support the view that when students receive high quality of instruction, sufficient time and adequate learning materials, they can achieve the required competencies (NCTVET, 2006; Smith, 2010).

The results further confirmed a direct relationship between feedback and the acquisition of professional skills although the effect was weak. This finding seems to support the notion that teachers generally have little time to offer coaching, frequent promptings and timely feedback on the progress of students' learning in order to attain mastery of specific competencies (Boahin and Hofman, 2012). As the basis of CBT is self-paced and mastery learning, providing task-oriented feedback and corrective advice could build learners' self-esteem towards the achievement of competencies required for professional tasks (Hattie, 2009). Teachers need to provide opportunity for regular interaction with students, initiate feedback dialogue with students and peers throughout the learning process to enhance innovation and creativity.

Contrary to our expectations, the model did not show a significant relationship between industry and the acquisition of professional skills. This finding is particularly striking because industry is critical to the relevance and success of CBT in all phases of the training programme (Smith, 2010). As indicated earlier, this finding must be interpreted with some caution because of the low internal consistency co-efficient of the items (.44). Moreover, industry involvement in this study was limited to industrial attachment programmes and students' perceptions without considering the viewpoints of other stakeholders such as teachers and industry-led agencies. Nevertheless, the findings from the interviews with the industry personnel seem to corroborate the results from the model. The fact that students find it difficult to get placements at the industry, which in some cases are not relevant to their study programmes imply that students do not have the opportunity to apply classroom theories and experiences to real world situation. This situation does not only discourage authentic learning and acquisition of technical skills but also deprives students of developing relevant professional skills at the workplace through relations and interactions among new and old workers, personnel, behaviours and resources. This finding however, supports the results of previous studies on CBT implementation in Ghana, which have also shown that industry is not really involved in the TVET study programmes (JICA, 2008; Boahin and Hofman, 2012).

Furthermore, there was no significant relationship between assessment and the acquisition of professional skills. This result seems to support the observation made at the training session where assessment tasks focused on the students' ability to perform specific skills for predictable work roles instead of encouraging initiative and creativity. However, recent changes in technology have been causing shifts in the nature of skills requirements at the enterprise level. Therefore, the current CBT assessment methods used in the Ghanaian polytechnics needs to move away from *competence for work* that emphasises more on routine tasks towards a *competence through work* that develops broad sets of generic skills and adaptable workforce. These findings add to the concerns and challenges associated with the assessment practices including RPL in the delivery of CBT towards the acquisition of required professional skills (Smith, 2010). Acquiring professional skills in CBT also means that assessment must not only focus on demonstrating skills but also the underlying theoretical principles and the ability to translate these into effective professional practice. More significantly, practitioners need to collect and analyse sufficient information about their students from a variety of sources and contexts so that they can adapt their skills in



different settings. Failure to recognise students' previous learning experiences in assessment practices defeats the purpose of organising CBT courses in separate modules, and undermines the learners' skill development and successful achievement of a vocational qualification (Smith and Keating, 1997; Mayet, 2006; Palmer, 2009).

## 9. Conclusions

This study was conducted in all the ten polytechnics in Ghana to investigate the perceived effects of CBT on acquiring professional skills. The findings showed partial support for the model of CBT implementation in the Ghanaian polytechnics presented in Fig. 1. The study adds a different point of view to modularisation of courses, thus promoting effective teaching and learning and hence, acquisition of competencies required in the industry. Our findings suggest that, quality of teaching is further enhanced by providing constructive and timely feedback at every stage of a module until required competencies are attained. As a powerful instrument of learning, feedback should contain task-related information and corrective advice to motivate and build learners' self-esteem towards the achievement of their professional skills. There is weak industry-institution linkage as well as poor quality of assessment practices in CBT implementation although a true CBT must be industry-focused with reliable assessment procedures in order to produce competent workforce in an evolving global economy (Sung et al., 2006; Keating, 2008). The need to develop the workplace as a learning arena capable of involving large number of students is one of the surest means to recognise diversity of interests, motivations and capabilities, while providing authentic learning and assessment environment towards the development of both technical and professional skills.

As an evolving concept, features of CBT have been variously described in different studies although there is a considerable overlap. The features described by Mulder (2004) and Wesselink (2010) provide comprehensive description of the general teaching and learning approaches in CBT and emphasise the need to situate the learning and assessment trajectories in more practical contexts (Wesselink, 2010). The features of CBT used in the current study emphasise the need for students to take charge of their own learning towards lifelong development of competencies in professional contexts and other domains of life.

This study however, has some limitations. Firstly, evaluating the perceived effects of the CBT implementation would have been more appropriate if teachers' viewpoints were consulted because convergent and divergent perceptions between teachers and students are likely to provide useful variables in investigating the teaching and learning process. Secondly, industry's involvement in CBT takes various forms, including the development of competency standards, identifying essential job skills, apprenticeship training and quality assurance. Focusing only on industrial attachment programme to evaluate industry's involvement towards the achievement of professional skills may not have provided a true reflection of its actual role in the CBT implementation in the polytechnics. As a valuable extension to the range of aspects investigated in this study, industry's involvement in CBT implementation in the polytechnics would be explored through the viewpoints of students, teachers and industry personnel.

Despite these limitations however, the study covered all five major CBT programmes piloted in the polytechnics. As a first major evaluative study, the results are relevant for the wide range of study programmes intended to become competency-based. The findings have added to the literature of CBT by providing students' perspectives and experiences in the Ghanaian context, thereby

providing useful information for the government and COTVET in formulating their policies for the TVET system.

## References

- Argüelles, A., Gonczi, A., 2000. Competency-based Education and Training: A World Perspective. Conalep, Mexico.
- Australian National Training Authority, 2003. What Makes for Good Workplace Learning? At a Glance. .
- Barrie, S., 2005. Rethinking Generic Graduate Attributes. HERDSA News, University of Sydney, Australia.
- Bell, G.H., Wade, W., 1993. Modular course design in Britain: Some problems, issues and opportunities. *Journal of Further Education* 17, 3–12.
- Biemans, H., Nieuwenhuis, L., Poell, R., Mulder, M., Wesselink, R., 2004. Competency-based VET in the Netherlands: backgrounds and pitfalls. *Journal for Vocational Education and Training* 56 (4) 523–538.
- Black, P., William, D., 1998. Assessment and classroom learning. *Assessment in Education* 5 (1) 7–74.
- Boahin, P., Hofman, W.H.A., 2012. Implementation of innovations in higher education: the case of competency-based training in Ghana. *Innovations in Education and Teaching International* 49 (3) 313–323.
- Boateng, K., Sarpong, E., 2002. An Analytical Study of the Labour Market for Graduates in Ghana. World Bank/National Council for Tertiary Education Project, Accra.
- Boahin, et al., 2010. Tracer Study on the Performance of Polytechnic Graduates in Ghanaian Labour Market, Accra, Ghana.
- Brockmann, M., Clarke, L., Mèhout, T., Winch, C., 2008. Competence-based vocational education and training (TVET), the cases of England and France in a European perspective. *Vocations and Learning* 1 (3) 227–244.
- Brown, P., Lauder, H., Ashton, D., 2008. Education globalisation and the future of the knowledge economy. *European Educational Research Journal* 7 (2) 131–156.
- Callan, V., Ashworth, P., 2004. Working Together: Industry and VET Provider Training Partnerships. Australian National Training Authority, Adelaide, Australia.
- Competency-based assessment (CBT) for polytechnics in Ghana, 2007, NABPTEX, Accra.
- Cornford, R.I., 1997. Ensuring effective learning from modular courses: a cognitive. *Journal of Vocational Education and Training* 49 (2) 237–251.
- COTVET Preparatory Technical Committee (CPTC) November, 2006, Ghana, Accra.
- Crebert, G., Bates, M., Bell, B., Patrick, C., Cragolini, V., 2004. Developing generic skills at university, during work placement and in employment: graduates' perceptions. *Higher Education Research and Development* 23 (2) 147–165.
- Cremers, P., Eggink, J., Hoetink, F., 2005. Competency-based Training: Curriculum (re)design Beyond the Hype. Hanze University, Groningen, The Netherlands.
- Curtain, R., 2004. Vocational Educational and Training, Innovation and Globalisation. National Centre for Vocational Education Research (NCVER), Adelaide.
- Deissinger, T., Hellwig, S., 2011. Structures and Functions of Competency-based Education and Training (CBET): A Comparative Perspective. Mannheim, Germany.
- Dubois, D., Rothwell, W., 2004. Competency-based Human Resource Management. Davis-Black, Oxford, UK.
- Eggink, J., Van Den Werf, E., 2006. Higher Education in the Netherlands. The Systems, Institutions and Degrees. NUFFIC.
- Gauld, D., Miller, P., 2004. The qualifications and competencies held by effective workplace trainers. *Journal of European Industrial Training* 28 (1) 9–22.
- Gibb, J., Curtain, P., 2004. In: Gibb, J. (Ed.), *Generic Skills in Vocational Education and Training. Research Readings*. NCVER, Adelaide.
- Gulikers, J.T.M., 2006. Authenticity is the eye of the beholder. (Unpublished doctoral dissertation) In: *Beliefs and Perceptions of Authentic Assessment*. Open University, The Netherlands.
- Guthrie, H., 2009. Competency and Competency-based Training: What the Literacy Says. NCVER, Adelaide.
- Harlen, W., Crick, R.D., 2003. *Testing and Motivation for Learning*. Assessment. Kogan Page, London.
- Hattie, J., 2009. The black box of tertiary assessment: an impending revolution. In: *Tertiary Assessment and Higher Education Student Outcomes: Policy, Practice and Research*. Ako Aotearoa, Wellington, New Zealand, pp. 259–275.
- Hattie, J., Timperley, H., 2007. The power of feedback. *Review of Educational Research* 77 (1) 81–112.
- Hellwig, S., 2006. Competency-based training: different perceptions in Australia and Germany. *Australian Journal of Adult Learning* 4 (1) 51–74.
- Hennessy, E., Hernandez, R., Kieran, P., MacLoughlin, H., 2010. Teaching and learning across disciplines: student and staff experiences in a newly modularised system. *Teaching in Higher Education* 15 (6) 675–689.
- Horton, S., 2000. Introduction – the competency movement: its origins and impact on the public sector. *International Journal of Public Sector Management* 13 (4) 306–318.
- Jenkins, A., Walker, L., 1994. Introduction. In: Jenkins, A., Walker, L. (Eds.), *Developing Student Capability Through Modular Courses*. Kogan page, London, pp. 19–23.
- JICA, 2001. Development of a Master Plan to Strengthen Technical Education in Ghana. Accra, Ghana.
- JICA, 2008. Report of Baseline Survey of Competency-based Training: Technical and Vocational Education and Training Support Project. Accra, Ghana.
- Jöreskog, K.G., Sörbom, D., 2002. *Liseral 7: A Guide to the Program and Applications*. SPSS Inc., Chicago.

- Jonnaert, P., Masciotra, D., Barrette, J., Morel, D., Mane, Y., 2007. From competence in the curriculum competence in action. *Prospects* XXXVII (2) 187–203.
- Keating, J., 2008. Current Vocational Education and Training Strategies and Responsiveness to Emerging Skills Shortages, a Well-skilled Future – Tailoring VET to the Emerging Labour Market. NCVET, Adelaide.
- King, K., 2009. Education, skills, sustainability and growth: complex relations. *International Journal of Educational Development* 29, 175–181.
- Kouwenhoven, W., 2011. Competence-based curriculum development in higher education: some African experiences. *Technology, Education and Development* 125–146.
- Lizzio, A., Wilson, K., 2004. Action learning in higher education: an investigation of its potential to develop professional capability. *Studies in Higher Education* 29, 469–488.
- Matlay, H., Addis, M., 2002. Competence-based training, vocational qualifications and learning targets: some lessons for the learning and skills council. *Education + Training* 44 (6) 250–260.
- Mayet, A., 2006. Strengthening Education for All of South Africa through RPL CAEL Forum and News. JET Education Services, South Africa.
- McGuire, D., Garavan, N., 2001. Competencies and workplace learning: some reflections on the rhetoric and the reality. *Journal of Workplace Learning* 13 (4) 144–164.
- McGrath, S., 2012. Vocational education and training for development: a policy in need of a theory? *International Journal of Educational Development* 35 (5) 623–631.
- Mitchel, J., 2003. *Emerging Futures: Innovation in Teaching and Learning in VET*. Australian National Training Authority, Melbourne.
- Mitchell, J., Henry, J., Young, S., 2006. *A New Model of Work-based Learning for the VET Sector*. ANTA, Melbourne.
- Mulder, M., 2004. *Education Competence and Performance. About Learning and Development in the Agrifood Business*. Wageningen UR Oratie.
- Mulder, M., Weigel, T., Collins, K., 2006. The concept of competency in the development of vocational education and training in selected EU member states – a critical analysis. *Journal of Vocational Educational and Training* 59 (1) 65–85.
- NCVER (National Centre for Vocational Education Research), 2003. *Fostering Generic Skills in VET Provision And Workplaces*. Australia. <http://www.ncver.edu.au/generic.htm> (accessed 21.06.10).
- NCTvET, 2006. *A Coordinator's Guide to Implementing Competency-based Education in Schools*, Jamaica.
- NUFFIC (Netherlands Organisation for International Cooperation in Higher Education), 2005, August. *NFP-NPT Newsletter* The Hague, Netherlands.
- Palmer, R., 2009. Skill development, employment and sustained growth in Ghana: sustainability challenges. *International Journal of Educational Development* 29 (2009) 133–139.
- Peng, W.J., McNess, E., Thomas, S., Wu, X.R., et al., 2014. Emerging perceptions of teacher quality and teacher development in China. *International Journal of Educational Development* 34, 77–89.
- Reuling, J., 2002. *Vocational Training and Lifelong Learning in Australia. Observation and Conclusions from a German Perspective*. NCVET, Adelaide.
- Smith, E., 2010. A review of twenty years of competency-based training in the Australian vocational education and training system. *International Journal of Training and Development* 14 (1) 54–64.
- Smith, E., Keating, J., 1997. *Making Sense of the Training Reform and Competency-based Training*. Social Press, ISBN: 1876033193.
- Sung, J., Raddon, A., Ashton, D., 2006. *Skills Abroad: A Comparative Assessment of International Policy Approaches to Skills Leading to the Development of Policy Recommendations for the UK*. Research report May 16.
- Swales, S., Roodhouse, S., 2004. Vocational qualifications and higher education: some policy issues. *Policy Futures in Education* 2 (1) 31–52.
- Thompson, P., 2013. Learner-centred education and cultural translation. *International Journal of Educational Development* 33, 48–58.
- Tigelaar, et al., 2004. The development and validation of a framework for teaching competencies in higher education. *Higher Education* 48, 253–268.
- Tikly, L., Barrett, A.M., 2011. Social justice, capabilities and the quality of education in low income countries. *International Journal of Educational Development* 31 (2011) 3–14.
- Waterhouse, P., Virgona, C., 2004. *Two-dimensional Work: Workplace Literacy in the Aged Care and Call Centre Industries*. NCVET, Adelaide.
- Wesselink, R., 2010. *Comprehensive Competence-based Vocational Education: The Development and Use of a Curriculum Analysis and Improvement Model*. The Netherlands, Wageningen University.
- World Bank, 2009. *Accelerating Catch-up: Tertiary Education for Growth in Sub-Saharan Africa*. Washington DC.