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COMPETENCE-BASED TRAINING IN POLYTECHNICS IN GHANA: A REVIEW

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Content

1. Introduction.....	1
2. Competence-based training: development of the framework for the review	4
2.1 Innovations.....	4
2.2 Characteristics of learning environments.....	5
2.3 Innovative behaviour	5
2.4 Process of innovating	6
2.5 Characteristics of the contextual factors	7
2.6 Aspects that have to be considered.....	8
3. Data collection.....	8
4. Results	9
4.1 Characteristics of CBT	9
4.2 Process of innovating: activities, roles, development strategies and diffusion.....	11
4.3 Context: school, society and institutional framework.....	12
4.4 Results so far	16
5. Recommendations	17
References	23
Attachment 1. Data collection: interviews and meetings.....	25
Attachment 2. Participants workshop at the University of Groningen.....	26

Preface

In October 2009 I visited Ghana to develop this review. There are many complications that occur in the development of CBT in Ghana. Considering the developments in other countries, I do think that most problems and obstacles I have seen and heard are very common in every development trajectory in every country. I think that Ghana has a major advantage in comparison to countries that have already been working on the development of CBT for a longer period of time: they can learn from the experiences made in other countries. The impression I got during all the interviews and meetings, is that most participants are keen to do so. Furthermore, I think that, which is also very common in such developments, all relevant actors have to take their responsibility: the students over their own learning processes, the school/teachers for the ongoing development and their performance in CBT, the schools in their relations with companies and local authorities, government and national bodies for facilitating the schools in these developments and realization of CBT. Only then can these processes become a success in the long run. And be sustainable. During the process of this review, it became ever clearer that the main focus of this review had to be; what can be done to make CBT a sustainable and successful development.

It is important to realize the implications of such large innovation trajectories. One important aspect in that respect is the need for recognition of regional differences and its implications for good education. Furthermore, the awareness that there are huge individual differences implies that there cannot be one system that suits all perfectly. And probably even more important: every development is carried out by people. Therefore training and education and lifelong learning of all actors involved are continuously acquired.

I was only able to write this report because of the support of many persons of many institutions. Therefore, I would like to say a word of thanks. First of all I would like to thank all the school leaders, teachers and students of the schools I have visited and spoken to. They were all very open and I thank them very much for their hospitality and sharing their experiences and ideas with me. In addition, a word of thanks to the Dutch project members for their frank responses. Furthermore, I would like to thank all the other institutions (NAB, NABPTEX, NCTE, COTVET, JICA) for their time and hospitality. A special thanks to the employees of NAB, NCTE, NABPTEX who accompanied me during all visits throughout the time I spend in Ghana.

Regina H. Mulder

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1. Introduction

An important incentive for the development and implementation of Competence Based Training in Ghana was the fact that the government realized that both the quality and the size of the technical workforce are critical for the success of the economic situation in the country (e.g. Djangmah, 2005). Ongoing technological developments and economic developments as globalization have an effect on the demands of industry. Employers mentioned that graduates lacked essential skills (Boateng & Ofori-Sarpong, 2002). To lessen the qualitative and quantitative discrepancy between the demands of the labour market and the workforce changes had to be made in the education at the polytechnics.

There are examples of new forms of education. For instance, in 1997 the building technology department of Sunyani Polytechnic established hands-on training for preparing the students adequately for the building and construction industry. Then funding problems came up and they had a lack of equipment.

Various documents and analyses of the situation at Polytechnics in Ghana showed several problems (e.g. in: Boateng & Ofori-Sarpong, 2002; Boahin & Hofman, submitted). A report of Japan International Cooperation Agency (JICA) (2001) stated that curricula had been introduced from other countries, without adaptation to the Ghanaian context. It also made comments on the quality of the education, as has been done in a report of NABPTEX (Technical Committee on Polytechnic Education, 2001). Aspects that were mentioned were for instance insufficient quality of assessment and the strong emphasis on theory.

The mentioned awareness of the government resulted in several plans, as for instance the 'GPRS 2003-2005', and the 'Education Strategic Plan 2003-2015'. Especially the Draft TVET Policy Framework for Ghana, was important for the recommendation of Competence Based Training (CBT) as a model for delivery of training, and that it should be the cornerstone of a new policy (Djangmah, 2005). And so the innovation started.

From various reports several objectives for this innovation were derived: develop courses in many types of education in polytechnics, emphasis on practical skills to produce technically qualified individuals for direct employment and entrepreneurship. Experiences in other countries were used in formulating objectives. For instance experiences in Australia, where the goal was to improve the skills level of the workforce to make Australian industry more competitive in global markets (e.g. Smith, 1999). Also other countries as the Netherlands (e.g. Biemans, Nieuwenhuis, Poell, Mulder &

Wesselink, 2004) had at that time some experience with CBT. Especially in countries where vocational education is part of the education system there are developments that are relevant for the development of CBT in Ghana (see OECD, 2009). In the end, formulated concepts and practices were for instance that CBT provides a bridge between industry and clients, it formalizes work-based learning for the attainment of accredited qualifications. Mentioned were components of quality and assessment, such as the need for quality assurance procedures and a National Qualifications Framework, and the recognition of prior knowledge.

Then Nuffic started to finance 'Netherlands Programme for the Institutional Strengthening of Post-secondary Education and Training Capacity (NPT)-projects in Ghana'. The already named Sunyani Polytechnic mentioned in an interview that they were very happy with the start (for them in 2004) of the NPT projects, because of the mentioned problems that they had. There are different NPT projects for several disciplines / courses at polytechnics. The goal of those projects is to develop CBT. In the framework of these projects CBT is developed, in co-operation between Dutch colleagues and teachers and school leaders of the different polytechnics in Ghana. One of the NPT-projects focuses not on the development of CBT itself in a specific domain, but more on the structure / framework in which these developments take place, and more specific the roles, responsibilities and activities of the governmental bodies in the development of CBT (NPT-142).

The formulated goals of NPT142 were:

- through staff training, joint development of methodologies and instruments (for monitoring and evaluation, accreditation, sectoral management) further policy development and close interaction with the HE community, increase the capacity of the three supervisory bodies
- to effectively coordinate, assess and strengthen the relevance and quality of higher education:
- strengthen the quality monitoring systems of NAB,
- strengthen the capacity of the NABPTEX to facilitate the introduction of competence based training,
- to enhance the expertise of NCTE in higher education planning and management, budgeting and controlling, as well in monitoring and evaluation,
- to strengthen the capacity of the boards/councils and the secretariats of the supervisory bodies to enable their better functioning.

This review was carried out in the framework of this project.

It is important to realize that the evaluation of the development of CBT is not the objective of this review, neither is the evaluation of NPT-projects, nor researching the effects of these activities. Evaluations are already foreseen in the framework of several NPT projects. Results indicated for instance that the overall performance of NPT in Ghana is fair (Nikiema, 2008). Hurdles were also mentioned: aspects as mistrust between cooperation partners, difficulties with Ghanaian allowance culture and communication was mentioned, under budgeting, not enough consciousness on the project time and the use of that time (Kouwenhoven, Oduro & Nsiah-Gyabaah, 2009). These aspects seem to be about cultural differences. In The Nuffic report (2008) it is mentioned that CBT implementation at that time was ongoing, but that some aspects hindered a smooth implementation. Aspects mentioned were that adequate funding (from government) was lacking, a lack of coordination by the supervisory bodies, input from NABPTEX through NPT142 was judged as limited, there was a lack of assessment guidelines, students expressed concerns about the recognition of their CBT-style diploma's, and there was lack of accompanying policies (government involvement) to enable full implementation of CBT programmes (p.6). All mentioned aspects partly refer to the processes of the NPT projects themselves, and partly to the quality of the product CBT that was developed.

The objective of this review is to discover possibilities to move CBT forward in an effective and sustainable way, with a specific focus on the possibilities for the governmental institutions NCTE, NAB, NABPTEX and COTVET. The question that is going to be answered in this report is *how can these institutions support further development of CBT and improve the development and implementation of CBT in Ghana and make it sustainable?*

To get an answer to this question, it is necessary to get insight in what actually is developed. What does CBT look like in Ghana, what is the added value? What have been the problems so far? In addition, it is necessary to find out how it was developed and if and how the implementation took place. It is important to discover bottlenecks to be able to foresee them in future. What can be improved, and how? What have to be the roles of the different parties? The review needs to state where there are possibilities for quality assurance and further development, to make this a sustainable development.

For describing relevant aspects of CBT as it is today, a framework for analysis will be presented in the next chapter. For that literature on innovation was used. The third chapter explains the structure of the empirical part of this review. The results of all the collected data will be presented in chapter 4. The last chapter contains conclusions and recommendations.

2. Competence-based training: development of the framework for the review

The goal of this chapter is to develop a framework that can be used to analyze the situation of CBT in Ghana. Because the development of CBT has to be considered an innovation in the context of Ghana, insight is needed in what is meant with the word 'innovation'. What is known of the effects of CBT and what aspects have to be looked at to be able to determine the results/effects? In addition, attention will be paid to the kind of behavior that is required for development and use an innovation. And, attention will be paid to what successful innovations strategies might be. In this respect the roles of the different relevant actors will be described. This chapters ends with an overview of aspects that have to be looked at to get insight in the possibilities there are to optimize the situation of CBT in Ghana.

2.1 Innovations

Research on innovation has a long tradition. Mostly the work of Schumpeter (1942) is seen as a start of this type of research. From a macro perspective sociological research has studied the influence of the environment on creativity and innovation (Ford, 1996). On the other hand, psychological research, especially organization psychology, analyses individual and intra-individual determinants of the success of innovation implementation (Amabile, 1997). Creativity, i.e. the production of novel and appropriate ideas is considered as a necessary first step for an innovation (Amabile, 1997; West, 2002). The awareness arose that innovation is not only creativity, but also the development of ideas and their application and implementation (e.g. Kanter, 1988). In existing definitions 'novelty' is always an important aspect (e.g. OECD, 2009). What is lacking in the definitions is that innovation has to include the realization of *new* objectives. Otherwise any change would be an innovation (e.g. Fullan, 1991). In addition, often the fact that innovation is made by people is neglected. The definition of innovation that is used here is: Innovation is ... *developed and realized ideas on products or processes, that are novel and where the objectives are new, and that can be used by one person, a group or organization and that are useful for (the same or other) individuals, groups or organizations* (Messmann, Mulder & Gruber, 2010). According to this definition the development and implementation of CBT in Ghana has to be considered an innovation. To analyze innovations in education different categories of aspects have to be distinguished. Firstly, the characteristics of the innovations themselves. Secondly, the behaviour of the relevant actors involved. Thirdly, the process of innovating. In addition, the characteristics of the context are not to be neglected (e.g. Fullan, 1991: Mulder, 2004). In the following paragraphs these categories will be explained.

2.2 Characteristics of learning environments

If an innovation in education contains the development of learning environments, as the development of CBT does, various aspects of those learning environments have to be analyzed to be able to find out if it was successful. There are roughly five different categories to consider: the content of the training, teacher behavior, the didactical method, assessment, and the characteristics of the context where it is situated (in school or on-the-job) (Mulder, 2004).

In vocational colleges the two pillars for CBT are on the one hand more constructivist learning theories and the second pillar are the demands of society and labour market (Billett, 2001; Mulder, 2004). In relation to the second pillar: the learning objectives are defined in competences, and not in separate aspects of knowledge, skills and attitude. Competences are a combination of skills, attitude and knowledge related to future jobs. They are required to solve problems at work. Competencies have value in society (e.g. Ellström, 2007; Onstenk, 2004). The main important aspect is that the development of students is central in CBT. And not, like in many education systems, the organization of education. Putting the development of students first requires a paradigm shift. It means that education has to be organized around the learning processes of students, and not the other way around. The consequences are that everything has to be organized around the learning processes of the learners. The facilitation of learning processes of students is the main focus. This leads to the awareness that CBT is a holistic approach. More concrete it means that all parts should be consistent and coherent. There are major differences in comparison to traditional education, where the organization of learning is the main focus. For example the content has to consist of job specific and holistic job tasks. Assessment must be authentic (Gulikers, Bastiaens & Kirschner, 2004). The latter means for instance that there is less structure in subjects and subjects can be integrated.

CPB is more than 'just' a learning environment. All these demands lead to the need of all relevant actors being motivated and having a positive attitude towards CBT (Fullan, 1991; Mulder, 2004). For the development of CBT, being an innovation, innovative behaviour is required.

2.3 Innovative behaviour

Innovations can only be developed when individuals have innovative behaviour. De Jong and Den Hartog (2007) say that ..."innovative behaviour can be seen as a multi-dimensional, overarching construct that captures all behaviours through which employees can contribute to the innovation process" (p. 43). Innovative behaviour consists of more than creativity and a new idea. It consists of three parts (Janssen, 2000; Kanter, 1988). Firstly, the *generation of ideas*: production of novel

and useful ideas in a particular domain. The second component is the *promotion of ideas*: dissemination of ideas which includes finding allies and sponsors that can help to realize the idea. Thirdly, the *realisation of the idea*: production of a prototype or a model of the innovation that can be experienced by others. Innovative behaviour at work can thus be defined as: *cognitive or physical actions of employees, that are carried out individually or in social interaction, and that lead to the generation, promotion and realization of new and applicable ideas* (e.g. Kanter, 1988). This also goes for educational settings (Messmann, Mulder & Gruber, 2010).

It is important to realize that there is a difference between being innovative, i.e. carrying out innovative behaviour on the one hand, and participating in innovations. Both aspects are important for CBT in Ghana. They need different conditions. Here we are talking about being innovative. In a interview study among secondary vocational educators in Germany, we found that innovative behaviour is predominantly characterized by: social activities (communicate with colleagues, find allies for an idea, information, opinions, perspectives, suggestions from various sources), and the importance of reflection was emphasized (past experiences, ongoing innovation process, assessment) (Messmann & Mulder, in press). Triggers for innovative behaviour were very often a characteristic of the teacher himself: his job satisfaction, his/her motivation to improve the existing situation, the attitude to further development, curiosity, openness for new ideas, problem awareness. An interesting result of this study was that always one of these mentioned aspects was part of a trigger. In addition, actual problems or challenges were mentioned as triggers. At school level different aspects are mentioned, such as the vision of the school, or the lack of communication, the dysfunctional organization of education or the lack of adequate tools and materials. Next to aspects at school level, challenges at student level were mentioned, such as problems with discipline, absence, drop out, or innovation fatigueness.

2.4 Process of innovating

A different perspective on what learning processes of students are and how they have to be facilitated such as CBT does, has consequences for how it has to be developed. These development strategies that used to be common, such as the systemic approach (Romiszowski, 1984), where objectives are defined, translated in to learning goals, and aspects that have to be taught, that are then implemented, and evaluated (see also OECD, 2009) cannot be used here. More flexible strategies are required, that allow more flexibility in the sequence of the different development stages and in the actors that are involved in the different phases. For instance the relational approach (e.g. Kessels, 1993). An approach like Design Based Research can also be helpful (Collins, 1992; Hoadley, 2004). Both these approaches leave room for non linear development processes as

well as for the active participation of various actors (like students, teachers, companies, etc.). So, one aspect that has to be looked at is how CBT was developed and what strategies were used.

Next, the characteristics of the process of innovating are of importance. Three different phases can be distinguished here: the initiation, the implementation and the results (the level of implementation, objectives, side effects) (Fullan, 1991; Mulder, 2004). In the initiation aspects as the attitude towards the innovation of all actors is important. Major problems can arise when for instance teachers do not want to take part in innovations. In addition, aspects as a plan for implementation, the decision to make the innovation and the innovation strategies are of importance. For being successful, an innovation has to be implemented. This is not an easy process. Often a 'not invented by me' syndrome occurs. To avoid this effect, teachers should take part in the development of innovations. In for instance vocational education it seems that bottom up approaches seem to be more successful. Especially when the teachers are supported by (middle) management and school leaders (e.g. De Bruijn, Hermanussen & Van de Venne, 2008; Mulder, in press). In the implementation phase aspects as changes in the organization, rules and procedures, changes in users' opinions, and changes in the innovation are important (Lagerweij, 1987; Mulder, 2004; Fullan, 1991).

In vocational education, an evaluation study of the Dutch system showed that changes in the (school) system have difficulties to 'land' at the level of the primary processes of learning processes, because it starts with changes in the law, than goes through the institutional system, has to go through the organization level of the school, and then end up in the classroom (Nieuwenhuis, Mulder & Van Berkel, 2004). This is a long way and not always efficient and effective.

2.5 Characteristics of the contextual factors

Characteristics of the context can and do influence the development and the impact of CBT. There are two main levels to distinguish in the context, namely the school (organization) and the context of society. Characteristics of schools that can be a condition or determinant, are for instance their structure, if they have autonomy, if school leaders and teachers take their responsibility, and if they have experience with innovating.

Important aspects to consider at a wider level are national and local education policy, and the structure of the education system. For instance if it centralised at a national level, or if there is autonomy at a regional level. Fullan (1991) already pointed out that characteristics of society and educational policy determine the success of educational change. The same goes for education in polytechnics. To improve the quality of education, local and national authorities tend to change the educational system for this purpose. The OECD recently focused on the possibilities of systemic

innovation for improving vocational education (OECD, 2009). In addition, the relations with companies, and the legal framework are of importance.

2.6 Aspects that have to be considered

Summarizing the factors that have to be researched in order to be able to find out if there are possibilities to improve the development of CBT must start with *characteristics of CBT*: its content, teacher behaviour, assessment, the context and didactical methods. Furthermore, the *innovative behaviour* of teachers and others and the participating behaviour of all relevant actors have to be studied. The *attitude, roles, responsibilities and activities of all relevant actors* have to be taken into consideration: students, teachers, school leaders, companies, local and national educational bodies and organizations and government. In addition, the *process of innovation*, with the mentioned roles of all actors, as well as innovation and development strategies and the results of CBT have to be discussed. Furthermore, the *conditions at a national and policy level* have to be considered.

3. Data collection

Below a short overview is listed of the activities that have been carried out in the development of this review.

To get insight in the actual situation, and find possibilities for further sustainable development of CBT in Ghana different sources were used.

1. Analyses of documents.

The documents collected were very divers. Some project plans and reports of some of the NPT-projects were used. Furthermore CBT material of some of the schools was studied. Some documents of PhD-studies of Ghanaian doctoral students were analyzed. And I received some documents on accreditation of NAB.

2. Interviews with project leaders of various NPT/GHA projects.

Project leaders of in total 4 different NPT-projects were interviewed. (For an overview see attachment 1).

3. Interviews with school leaders and teachers of all participating Polytechnics in Ghana.

Sometimes the interviews took place with a small number of staff. Some group interviews were carried out with staff of four schools at the same time, and took a whole day. At the schools that were visited I also talked to students during their classes.

4. Interviews and meetings with organizations.

During meetings with the following organizations relevant information was collected: NCTE, NAB, NABPTEX, COTVET, JICA.

Through these different ways many data were collected. These data were analyzed according the framework as presented in chapter 2.

5. Workshop meeting in Groningen (21-06-2010).

There were representatives of NAB, NABPTEX, University of Groningen and Hanze University of Applied Sciences. In this workshop the outcomes of the review were presented and discussed. The goal was to inform the participants for Ghana so that they are able to understand the outcomes and can improve the current situation in Ghana. The results of the workshop are included in this review.

4. Results

In this chapter the results of the analyses of all mentioned documents and interviews are presented. Important is to realize that determining the success of the institutional framework of CBT, it first has to be made clear what the characteristics of CBT actually are. Therefore characteristics of CBT in Ghana will be described. The information on the development of CBT and the roles of the various actors will be described. Finally, some aspects of the results of CBT so far will be mentioned.

4.1 Characteristics of CBT

Characteristics and mentioned problems were listed. With CBT new objectives are formulated. The goal is that students are better prepared for carrying out their future job.

The content of education has changed. It is far more job oriented. It is far more about technical knowledge, skills and attitude all together. Practical work, the actual carrying out of job specific

tasks has increased everywhere. Still, a stronger integration of practice oriented tasks in education is wanted.

Didactical methods have changed as well. Far more training is carried out in projects. Teachers tell that education has to be more student-centred than before. The students work harder than the teachers. Teachers mention changes as more hands on education, students work together in groups much more. Many state that there is not one didactical method.

Individual coaching of students takes place. Students tell that the teachers support the students with their projects. Students are more often observed by teachers when they carry out tasks. A teacher mentioned that they have max. 6 students in coaching sessions.

The attitude of teachers towards CBT varies. Most of the many teachers I spoke to see the relevance of CBT. In relation to the ideas that they have on what competence based training is, there is variance in ideas. In general the most important aspects are mentioned at every location teachers were been spoken to. In addition, it has to be mentioned that the variance is not larger than it is between the Dutch consultants. Teachers' behaviour has changed. They cooperate more, and develop CBT within their teams together.

Lessons take place at school. They work in project teams in classrooms. Students also make practice assignments in practice classrooms that look more like a job context (for instance a garage where they have to repair a car). It is mentioned that to be able to carry out job specific tasks smaller classes are required, and more space (larger rooms). There was one complete new building for fashion education being built at the time of my visit, where a production line is possible. Problems were mentioned with the lack of possibilities to buy the required materials: sometimes money is lacking, sometimes legislation makes it impossible (oil for car mechanics).

Assessment was a major issue in almost all interviews. It was mentioned that the relation / integration of theory and practice is (still) missing, also in assessment. There is a system of 60-70 percent practice, and 30-40 percent theory. Major discussions were about the introduced system of pass or fail. Many teachers say that students are hard to motivate to give their best, when the only thing they can get is a pass. In addition, it is mentioned that it is not possible in this system to see progress in the students' development. It seems that it is hard for teachers to see the sense of the simple system pass/fail, and therefore it is even harder to sell it to the students (acceptability).

4.2 Process of innovating: activities, roles, development strategies and diffusion

In this paragraph the way CBT is developed is discussed, and the activities that various actors carried out. Furthermore, attention has to be paid to further development and the dissemination of CBT, now and in future.

In the development of CBT various actors play a role. Teachers develop CBT. They were supported by Dutch partners in the framework of the NPT projects. All schools mention examples of teachers and school leaders visiting the Netherlands for training, and colleagues from The Netherlands coming to Ghana, to support the development of CBT on location. Most of them are very positive about the support of the Dutch colleagues, about the teacher training in The Netherlands, as well as about the support in the development and acquiring the necessary competences, they got in Ghana from the Dutch. Most schools report that in the framework of NPT projects materials laboratories developed, as well as computer labs.

The support of the school leaders is needed to realize CBT. The support of school leaders is very diverse. Some are very active, others are less. Some teachers were very positive about it, others, at other schools were very negative. Some school leaders fully understand what CBT is, and what is needed. Others do not understand it at all. There are some problems with management and school leaders: teachers say that more resources and money are needed. Mentioned is the need for material and equipment, computers and the need for maintenance. Personnel of one school mentioned that they have the impression that because Nuffic is now paying, internal management (the school leader) is not financially supporting CBT. Some of them complain about their school leaders, that they do not understand CBT and are therefore not able to adequately support the teachers in the development and carrying out of CBT. Problems that are mentioned are for instance that school leaders do not pay enough for the required materials. Furthermore, some school leaders do not fully recognize the hours that are used for CBT. The hours are counted as practice hours, and therefore the teachers have to work more. In automotive education this was mentioned that more mathematics is needed by the students for their further education, but the teachers do not get the hours for this.

Some Dutch partners mentioned that some teachers do very well, and that there are teachers that do not really understand what CBT is about. Furthermore, some teacher themselves mentioned that still many teachers do not really realize what CBT is. Interesting was that some said that someone is needed that finally says what CBT is. The teachers mentioned that they need (more) time. The changes are immense. Development and implementation needs time.

There are great differences in the development strategies of the schools. In relation to the above mentioned problems the fact that there is little stability in school leaders and school management, as well as changes in teams, is not helping. It is mentioned that knowledge management is required and that NABPTEX developed such a platform, but that knowledge management in school hardly exists. Also in this respect it is mentioned that money is needed, as well as time and opportunities. In relation to quality management and assurance it has to be mentioned that some schools developed and use student questionnaires with questions on infrastructure, equipment, characteristics of the buildings, content delivery.

The role of companies is very diverse. There are a few good examples of cooperation with industry. For instance the participation of companies in defining the job profiles, or the questionnaires companies filled out in order to find out what the needs of the companies are. There are also examples of companies being part of the advisory board of a polytechnic. There are examples of placement of students, and participation in accreditation.

It was not mentioned that students take part in the development of CBT.

In the various polytechnics, and in various disciplines the situation and characteristics of CBT is different. In general, all relevant actors state that it is not fully developed. It has to be further developed. In addition, some schools mention that there are activities to disseminate CBT to other trajectories within one school. Mostly, this is very hard to realize. In various disciplines it was mentioned that the cooperation between different polytechnics is working well. It seems that cooperation in CBT- development functions better between different schools within the same study, than within a school for different studies. There is hardly any dissemination between the disciplines, but more in the same type of education at other polytechnics. For diffusion (more) time and money is needed. For dissemination purposes, liaison officers can be helpful, but they have to really understand CBT.

It is mentioned that diffusion processes are hindered by some cultural characteristics, especially the culture of not sharing.

4.3 Context: school, society and institutional framework

Next to the process of innovating, the framework needs recognition. Conditions for development and diffusion of CBT are the competences of the actors involved: especially school leaders and management of the school and teachers, but also involves persons of industry and academics (of accreditation boards for instance, or in assessment procedures). Next to that, there is the labour

market with its demands. And finally, there is the legal framework and the framework of education policy in the country (including governmental bodies).

Staff and management need training, on a regular basis. Firstly, on didactics, pedagogical themes. Secondly, it is also mentioned that they need to be trained by or within the industry, to get information on what new production systems are, new techniques etc. At a professional level it is argued that, for instance for the development of adequate assessment systems, international training is needed. In some polytechnics there are already thoughts about a train the trainer system to integrate new teachers in this system.

To further develop CBT, and for dissemination purposes, management has to be the starting point. Teambuilding of management and within departments is needed. Furthermore, team building of small teams is acquired. The relation between school management and departments has to be improved. It is mentioned that every department needs a project director.

It has already been mentioned that many teachers lack the awareness of what CBT really is. It is mentioned that many teachers are not really interested. Support of CBT developments only comes from the teachers that work with and on CBT. Teachers need to be properly prepared for their job. That means adequate teacher education as a starting point. Mostly teachers come from universities, where there is no knowledge about CBT. There is no placement of teachers in industry, yet. Although it is needed. The only training they got is from the Dutch partners. Furthermore, some teachers complained that they have to constantly move on with their job, get qualified, which includes a promotion (dissertation). The complaint was that only research is recognized.

One problem of the situation of teachers in school is the teaching overload. New teachers are needed. Another problem that has been discovered deals with recognizing hours: teachers get half of the credits for teaching hours in CBT, because they are recognized as practice hours. In schools where that happens the teachers are grieved. Another aspect is that replacement of equipment is required. In addition, the staff has to be trained, in all the relevant institutions and organizations.

To get insight in the situation of CBT in Ghana, and the possibilities for improvement, it is necessary to have a look at some characteristics of the situation of CBT, the labour market and the legal structure. In comparison with other countries, in Ghana there is mainly small scale industry. The critical role of the informal sector is widely recognized. The general situation is that there is a large informal sector into which the majority of school leavers migrate with very little chance of further education and training which is detached from the small and struggling formal sector. This has

also consequences for the possibilities to co-operate with industry. This is harder here than with clearly organized industry.

The relation with industry, when organized properly, can have large benefits for those companies, for the schools and most important for the students. It must be realized that there are different levels on which cooperation can take place, and on many different aspects. For instance, funding by industry, development of the assessment, definition of job profiles and required competencies, placements of students and placement of teachers.

The role of industry, on the other hand is in practise not always ideal. For instance, in some cases it seems that industry takes over the students that worked in that specific company (e.g. on-the-job training): after the on-the-job training they stay there, because they get a job offer and they do not show up in school again to finish their education.

Sometimes problems are mentioned that are not directly related to CBT (only), such as that in many regions in the country there are no on-the-job-placements possible. The students have to travel to or live somewhere else, for that money is needed.

Sometimes the schools are faced with legal restrictions. For instance in the car mechanics, teachers are, by law, not able to buy, and have at school, all the things they need (e.g. environmental laws, safety). For instance, to make tasks authentic, shops could be opened at a polytechnic, so that they can sell what they make. For instance, selling clothes at the fashion training. With this money part of the costs of CBT can be earned back. Then CBT could partly finance itself.

The formal responsibilities and task of the three institutions are the following:

NCTE (National Council for Tertiary Education): has the responsibility for the development of the quality standards and norms for the management and monitoring of the performance of tertiary education institutions. NCTE finances NAB (National Accreditation Board) and NABPTEX (National Board for Professional and Technical Examinations).

NAB: is responsible for accreditation of education, of both public and private (tertiary) institutions with regard to the content and standards of their programmes, is involved in quality assurance, development of assessment criteria and delivers assessors. NAB organizes the accreditation panels.

NABPTEX: is responsible for the quality control and periodic examinations of programmes at accredited non-university tertiary institutions in Ghana. It needs to make the curricula competence based. NABPTEX supports polytechnics in for instance supporting documents (checklists, etc.), organizes and makes assessment and exams, and organizes facilities for the implementation of programs.

In addition, since the Council for Technical and Vocational Education and Training Act, 2006, COTVET as an institution exists. One of the activities they carry out is the implementation of TVET Project (Technical and Vocational Education and Training Support Project), financed by the Japanese Government (Through JICA). According to the act (Act 718) the objects and functions of COTVET are to coordinate and oversee all aspects of technical and vocational education and training in Ghana. To achieve its objectives the Council has various tasks: formulate national policy, develop of a qualification framework. A new assignment is the control of accreditation (NCTE is only tertiary education). In addition, rationalize the assessment and certification system, facilitate research and development, promote cooperation with international agencies and development partners, issue annual reports, source funding to support TVET training activities, take measures to ensure quality in delivery of and equity in access to TVET, facilitate collaboration between training providers and industry to promote demand driven curriculum development and placement, and national internships programs. And advise the government on all these themes. It is an umbrella organization: all TVET. An industrial training advisory committee is part of the Council.

In an interview one aspect that was mentioned was that there are too many qualifications. A theme that they are concerned about is for instance the accreditation of prior learning. That brings us to two main aspects that were addressed in all interviews: assessment and accreditation.

Most schools try to change their HND education into Btechs. There are complaints about the competences of the members of the *accreditation* panels. It is stated that they do not know what CBT is. For instance persons (professors) from Universities do not have any knowledge about and experience with CBT. Probably part of the problem is caused by selecting these persons because of their domain specific knowledge and not on knowledge and experience with new forms of didactics. It is supposed to include industry, there are questions raised about if they are actually are part of these panels or not.

Important condition for adequate *assessment* is that competences are tested and examined properly: a high quality of assessment is needed. Teachers say that NAPBTEX used to organise and develop the assessment. Now, it is not clear to many teachers who is developing assessment and who is responsible for that. Teachers are doing more themselves. And then NAPBTEX has to control if the assessment is good and if teachers assess well. Many teachers argue that NAPBTEX does not know what CBT is, and therefore cannot develop adequate assessment.

Another issue in relation to assessment is the discussion about a valid rating system. There are many discussions about and different opinions on if there still has to be a detailed rating system, or if a system with pass/fail is sufficient or even better (fitting CBT).

There are problems mentioned that are related to the assessors. It is hard to recruit them. Partly, because they are not paid for this work. Suggestions of some schools for assessors were not taken into account by the selection done by NABPTEX. Teachers and school leaders mentioned that in their region industry is not involved. On the other hand, it is mentioned that academics were invited to act as assessor, but then the complaint is that they do not know anything about CBT. This leads to a situation that teachers do not feel that they are understood, and do not have faith in the competences of the assessors. And that means that in this way working with assessors has major problems, and is not effective.

NABPTEX has to take care of the quality of the exams, the competences of the assessors and to see to it that exams and diplomas have societal value.

4.4 Results so far

Some words need to be spent on the results of CBT so far. My interpretation is that a lot has been done, many things have changed and many components of CBT have been developed and are realized in practice. The real, objective results have to be found in the relevance of the qualifications for society. There is no scientific evidence, based upon research, about that. Teachers say that students get good jobs, and that companies are satisfied.

One school reported more drop out, as a result of the fact that students understand the traditional form of education better. (These effects you see in other countries as well, but can be seen as a positive and negative side effect). Students learn more, they are more creative. It is more demanding for them, with the result that they learn more.

All the collected data and information should be saved in some kind of database. The relation between what is done in school, what students learn, and the relevance of that for society can be improved by showing the results of students' work to people, organizations and companies outside school.

There are some topics that need good research: training needs assessment, monitoring of students progress, and their career, and evaluation of education.

5. Recommendations

In this part of the review recommendations are formulated. They are based upon the analyses and interpretation of the results of the data collection on the current situation in the polytechnics in Ghana, as mentioned in chapter 4. The results of the interpretation and analyses are combined with results from empirical research, and theories on innovations and dissemination.

For sustainable improvement and further development of CBT, the effects of CBT so far have to be adequately researched. It has to be measured what the effects of CBT are. For measuring effects of training there are different output measures available (e.g. Kirkpatrick, 1987). Firstly, the satisfaction of for instance students can be assessed. In some schools that is already taking place. Mostly in relation to quality assurance. In some PhD-studies these kinds of data are collected. The next step is to assess the required competences of the students. The third level is the changes in behaviour of the students. Especially in their job performance. An indicator for success is also the school career and if these students get an adequate job after their education. Important is to distinguish between qualitative and quantitative discrepancy between education and the labour market. How this discrepancy is at the moment, and how it changes ought to be monitored. Several aspects of monitoring have already started. For instance what position graduates have at the labour market, and how they value the education, in the Tracer Study carried out by NABPTEX, and what the ideas are of industry about the graduates in the Rationalization Study carried out by NCTE. To determine the effect of CBT, research on the development, implementation and the effects of CBT needs to be carried out (e.g. OECD, 2009).

Improvement and further development of CBT means, that the content has to become (even) more practice oriented, didactics and methods have to be improved so that it gets more student oriented. Also coaching of students has to be improved, as well in classes as in their career decisions. This requires specific competences of teachers (e.g. Mittendorff, 2010). The essence of CBT is that the development of the students is the leading aspect. Everything should be organised in a way that this development is optimal. This is in contradiction with the situation before CBT (in (more) traditional education). This means a paradigm shift. For teachers that is not easy (nor for all the other actors involved!). Teachers need to be supported to adapt to these changes. Therefore further development of teachers is required. Part of that can be organised in teacher training. Also, for instance to get more insight in the processes and demands of companies, on-the-job training of teachers in companies should be intensified. Teachers could be motivated with specific

incentives. In addition, train-the-trainer programmes can be very helpful for teachers: that they have the opportunity to learn from one another and with each other. The latter needs to new knowledge, of which the further development of CBT can profit.

It is important that teachers understand what the goals of CBT are and what the possibilities are. And then translate them to their own situation. In addition, teachers increasingly have to face differences between students. Differences between students become clearer in CBT because it is more student-centred. Teachers need to be trained to deal with cognitive and cultural diversity, and differences in interests, learning styles, age and prior education and knowledge etc.

Because there are so many (mentioned) aspects that the teacher faces in CBT, they have to be prepared carrying out all those tasks. Students have to get prepared in teacher education. This implies that proper teacher education is required, that consist of subject content, but also (and definitely more than it is now) on didactics (CBT) and on more psychological and pedagogical issues that are relevant for teachers.

An important part of the actual CBT is the issue of assessment. There is a lot of confusion about who is responsible for what. That has to be made clearer: who is responsible for the development of assessment, who for controlling the quality, and who for the selection of assessors. From CBT in other countries we know that schools need the possibility to adapt their CBT to regional demands. That implies that they have to be able to deliver CBT, including assessment in such a way that local demands can be fulfilled, in order to make it possible for their students to get a job after graduation. That would imply that schools need a certain amount of autonomy, also in assessment. And that the quality control can be part of a governmental body. But this control should then not be carried out by focussing on every little detail, but more on a few central aspects that indicate the quality.

There is also a lot of confusion and misunderstanding about a valid rating system (Pass/Fail). There is no agreement on that point, not between, but also not within organizations. It seems that of all organizations (including governmental bodies), additional training is required in what the pros and cons are of a pass/fail system, and how to overcome practical problems, such as the mentioned lack of motivation of the students if they do not get a grade that is more specific. This, by the way, can be solved by also making students clear what the advantages are of this system, and what the sense is. This can of course only be done if the teachers themselves know this very well, and are convinced of CBT.

As mentioned before, for sustainable CBT, further development of all parts of CBT is required: content, didactics, assessment, etc. This requires teachers having the right attitude and compe-

tences. Next to that, school leaders should support the further development of CBT. They need to understand what CBT is, what the goals and implications of CBT are. And they need to have the right skills to support their teachers. Currently there are some problems with these requirements. That can lead to several problems that endanger CBT. For instance where CBT in school does not get enough money. Another example is the situation in which teachers mentioned that their CBT hours in the school are only recognized as practice hours, and therefore they have to work more hours. One of the reasons that school leaders miss important information on CBT and competences is probably due to the fact that school leaders are appointed for a short period of time. More continuity and stability in school leaders could improve the role of the school leaders. (Actually, the same goes for management). And the school leaders need support to cope with the demands of CBT, so that they can move on the development of CBT, support their teachers and the students. Part of the problem could be solved in training for school leaders. Furthermore, coaching trajectories can be very helpful, and / or supervision. In addition, following some theories on organization development, it might be important that the school leader, and management, themselves take part in the development of CBT.

For further development, adaptations in certain conditions are required. An example is that schools are not able, because of legal restrictions, to put their creative ideas in to practice. Although more practice oriented tasks are needed to improve CBT. One school mentioned that they are by law not allowed to have at school the required fuel for the cars that they repair. Or, a school is not allowed to sell the products that the students made. Another example is that for teachers to stimulate them to participate in training, changes in tax policy could perhaps be helpful. All in all, the legal and policy context could be looked at, and adaptations can help, to improve the possibilities of improving CBT.

One important aspect that can be used more to further develop CBT is the cooperation with all sorts of companies. These are not optimized yet. There are many possibilities in cooperation: funding, development of assessment, definition of job profiles and clear definitions of required competences of the students that enter the labour market, placements of students and teachers. An important possibility for improvement of CBT lies in the cooperation with companies, and having them taking part in the actual CBT. This can be realized in all sorts of forms: having small companies at the side of the school, having personnel of companies working together with teachers with a group of students, taking an active part in the assessment of students, etc. The condition is that they need to be well informed about what the goals and demands of CBT are. They will learn that whilst actively taking part in CBT, and they partly need some training. For instance for the role of

assessor. This accounts for every person who is assessor, they all need to understand CBT very well, and what the demands of adequate assessment are. And it also goes for all others constructing the assessment. In addition, also the persons that take part in the accreditation procedure often need to be better prepared before they carry out the accreditation.

For optimising assessment (the quality and the procedures), and the accreditation (quality and procedures), it is, next to all the aforementioned training needs, required that the structures of tasks are clear. Clarity in responsibilities of actors and organizations is not optimal yet. There needs to be a clear structure of who is responsible, and who carries out what tasks between the organizations NAB, NABPTEX, NCTE, and COTVET. This is highly relevant for at least the following issues: (all parts of) quality assurance, development of assessment, all aspects of accreditation, training of teachers, school leaders, assessors, companies, etc., accreditation of companies and organizing conditions (legal restrictions, tax measures to support teacher training, etc.). When a clearer structure is realized, it is important to communicate that very clearly with all other actors: school, etc.

To optimize CBT all relevant actors should be involved in the further development. Teachers and school leaders, also companies and students should actively take part in this development. Next to the actual development, for sustainability reasons diffusion is important. In practice this is (in every major innovation, also in CBT in other countries) very hard to transfer CBT from one study to another, and from one school to another (e.g. Mulder, in press). In Ghanaian polytechnics sometimes diffusion exists between schools for the same trajectory (subject), but hardly within schools for other trajectories. Important for diffusion is that there is communication. That communication has to be on the specific components of CBT, by different persons of the separate entities (schools, or trajectories). One of the aspects that is relevant, also based on experiences in other countries, and according to innovation and organization theories, is that multiple expertise is helpful. Concrete, that means that it should be possible that teachers have a specific expertise on a specific part of CBT, and to use that optimally, it requires the possibility for division of labour in a school. Based on a review of theories on organisational development, it can be stated that to improve diffusion different questions have to be answered. These questions help to analyse and understand the goals, the possibilities and the limitations of the innovation (CBT in a specific setting) for other settings (studies, trajectories, schools). This is required as a condition for diffusion. In addition all relevant actors, teachers, schools and other relevant institutions, need to analyse the setting where CBT has to transfer to. This is required to make sure that the new form of CBT fits the new context: its actors, its goals, that it is a solution for the problem in that (school)setting, in

that specific region, etc. (Mulder, in press). There are roles to play in diffusion for teachers, school leaders but also for governmental bodies. The latter can support and facilitate schools by organizing diffusion (also in enabling that the teachers get paid and recognized for their work), and being the outsider that coaches the schools and give them new ideas and insight from time to time.

An example of how some of the mentioned suggestions and actions can be organized is the following concrete proposal to improve sustainable development of CBT and to stimulate diffusion.

The goal is to support the schools in their own further development.

- Therefore training is needed of all mentioned actors: teachers, school leaders, assessors (NABPTEX could play a very important role in that). And other programmes could be developed: train the trainers programme, coaching trajectories, etc.
- Themes that require training (for different actors):
 - o How diffusion can be organised
 - o How to organise ongoing development
 - o The relation with industry, how to improve that on all sorts of aspect (sponsoring, assessment, involvement in CBT, etc.)
 - o Organisation von sponsoring, funding

To realize this the following procedure could be carried out, which is in line with the activities so far:

- support of Dutch experts, to develop together with the local teacher a trajectory (specific demands: local demands, demands of teachers there).
- Relevant actors of Ghana together with a few experts from The Netherlands: organize workshops. There the Ghanaian experts can learn together with the teachers, school leaders etc. For diffusion it is important that teacher train teachers of others trajectories, and at other schools. These teachers that will do that, need to be trained for that. When they know how to do it, then they teachers can manage themselves, and do not need external support anymore. When these teachers carry out their task, they need to be facilitated (get the time and money).
- For optimizing the further development of CBT and diffusion, school leaders need support.
- To realize all this, an expertise centre is required. Focus is: support schools in their development, so that they will be able to further develop CBT on their own. This centre can carry out training (at least part of it), and help teachers to develop training (for train the trainers programme). In addition, support structures can be developed: coaching trajectories organized, etc.
 - o This centre can be the task of an existing organization, or a new one

- It is important to discuss with them all the consequences of the outcomes of this review, and also
- How to organize an expertise centre (organization, roles and responsibilities of the institute)
- A possible way to get this started: for instance by having a few relevant actors visiting The Netherlands. Making a plan for the development of such an institute together with some experts from the Netherlands that have already done that. In Ghana, together with a few persons (including teachers, school leaders) making a plan on how sustainable development and diffusion can and has to be organized. These persons should get the time and money for that. The next phase would then consist of carrying out the plan.

All in all, it has to be realized that within a few years a lot has happened. Many interesting things have been developed. After the initiation and development of so many aspects of CBT a next phase is started or has to start. The phase of consolidation, and further sustainable development. A major innovation like this, in the world of today, is never finished. Important is to hold onto the good aspects, and to have the confidence and courage to 'throw away' the aspects that are not working well or are not good. The latter, of course, based on research on effects. It is necessary to be aware of the fact that innovation as such is not and should not be a goal in its self. Innovation is needed to improve the quality of education. For sustainability further development and diffusion is required. Therefore, government and governmental bodies should create an environment for the schools where there is a certain amount of stability (in persons, in expertise), combined with a lot of flexibility (in answering local demands, in making improvements in CBT itself).

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Attachment 1. Data collection: interviews and meetings

Interviews with school leaders, teachers and students of schools:

Bolgatanga Polytechnic (Agricultural Engineering)

Ho Polytechnic (Agricultural Engineering)

Tamale Polytechnic (Agricultural Engineering)

Wa Polytechnic (Agricultural Engineering)

Accra Polytechnic (Fashion)

Koforidua Polytechnic (Automotive Engineering)

Cape coast polytechnic (Building Technology)

Sunyani Polytechnic (Building Technology)

Kumasi Polytechnics (Civil Engineering)

Takoradi Polytechnics (Civil Engineering)

Meetings with the leaders and staff of the following organizations:

NCTE, Accra

NAPBTEX, Accra

NAB, Accra

JICA TVET, Accra

COTVET, Accra

Interviews with project leaders of various NPT projects:

Hans Cortes, CAH Dronten

Marjanne Paardekooper and Hanke Leeuw, Hoogeschool voor de Kunsten Utrecht

Emilia van Egmond-de Wilde de Ligny, Eindhoven University of Technology

Willem Benjaminse, Hanze University Groningen

Adriaan Hofman, University of Groningen

Attachment 2. Participants workshop at the University of Groningen

Date: 21-6-2010

Ben Antwi Boasiako, NABPTEX

Peter Boahin, NABPTEX

Frances Tagbor, NABPTEX

Kwame Dattey, NAB

Emmanuel Oware Nyarko, NAB

Theorora Asamoah-Gyadu, NAB

Justina Delali Tsagli, NAB

Marcus Gabby, NABPTEX

Yaa Asantewaa Asabere, NABPTEX

Adriaan Hofman, University of Groningen

Wiebe Zijlstra, University of Groningen

Geertje Holtrop, University of Groningen

Els Loef, Hanze University of Applied Sciences

Christina de Vries, Hanze University of Applied Sciences

Regina Mulder, University of Regensburg