

Full Length Research Paper

An evaluation of demonstration and industrial attachment as strategies in implementing clothing curriculum: A case of a Masvingo Polytechnic in Zimbabwe

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This study examined demonstration and industrial attachment as strategies in implementing national certificate in clothing design and construction curriculum. A qualitative approach utilizing a case study of Masvingo Polytechnic in Zimbabwe was used. The population comprised of national certificate second year students, production managers in industry and clothing lecturers. The participants were drawn using purposive and convenience sampling. The participants were 10 second year students, 5 production managers and 4 clothing lecturers. Data were collected through interviews, observation and document analysis. It was established by the study that lecturers mostly used the demonstration method and supervised practice. However the effectiveness of the methods was sometimes hampered by the quality and quantity of facilities and equipment. Industrial attachment was found to be a useful strategy in exposing students to the requirements of the job. The study recommends use of field trips as a teaching strategy to make learning realistic where equipment is lacking. Moreover, more than one phase of industrial attachment could be effective in consolidating knowledge and skills learnt.

Key words: Evaluation, industrial attachment, demonstration, acquisition, skills, competences.

INTRODUCTION AND BACKGROUND

The clothing curriculum aims to produce artisans who have acquired skills and competences required by the clothing industry. According to national certificate in clothing design and construction curriculum, products from polytechnics are expected to effectively operate industrial machines and equipment. They are also expected to apply different skills and techniques in the production of varieties of clothing. Moreover many educational programs and practices, particularly those involving students acquiring technical skills tend to place more emphasis on availability of relevant resources compared to instruction or delivery strategies.

However the success of implementing any curriculum also depends on instructional strategies used. For effective implementation of the clothing curriculum, it is

essential to use strategies that enhance the acquisition of practical skills and competences. Skill acquisition in the clothing curriculum is an active process where students learn by doing (Oliva 1992). Reality is the interaction of an individual with the environment or an experience hence, the need for instructional strategies that can bring such a reality to fruition. A student can only effectively learn how to operate an industrial over locking machine by using the machine.

In view of the above, the study was meant to evaluate the effectiveness of the demonstration method, and industrial attachment as strategies in implementing the clothing curriculum. The study also attempted to show how these methods are being used to help students acquire relevant skills and competences.

RESEARCH QUESTIONS

1. How does the demonstration method contribute

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towards acquisition of skills and competencies for the clothing curriculum?

2. To what extent is industrial attachment an effective tool in the acquisition of skills and competencies for the clothing curriculum?

LITERATURE REVIEW

For curriculum to be effectively implemented, it is essential that relevant strategies be used. Training, practice and the use of industrial attachment have also been seen to promote acquisition of practical skills and competencies.

Practice and training

For curriculum to be relevant, it needs to be implemented through right practice and training. Curzon (1990) is of the view that in practice, skill will grow from carefully directed teaching and practice. Arends (1997), and Reece and Walker (2003) argue that it is important to provide students with the opportunity to practice new skills. Moreover, pragmatists like John Dewey cited in Oliva (1992) consider skill acquisition as an active process where students learn by doing. Similarly students learn best when they are actively involved in experiencing their world (Wertsch and Terwell 1999).

Demonstration

Bango et al. (1997), Chamberlain and Kelly (1981) and Central Africa correspondence course study module (CACC) (2002), consider demonstration method as a basic method for teaching skill type subject matter. Students learn clothing skills effectively when demonstrations on how to operate the industrial sewing machines like the jet machine, over locker, and button holer are conducted. Through a demonstration, students will be aware of the expected standard, for example, the expected standard of a buttonhole when making buttonholes on a garment. A demonstration provides direct experiences in the learning process. In other words demonstration is a physical explanation of the practical process.

One advantage of demonstration is that it utilizes several senses such as touch, sound, sight. (Gatawa, 1990). Demonstration method also has advantage; it presents ideas and concepts clearly and provides direct experiences to the learner. Newbury et al. (1996) and Chamberlain and Kelly (1981), holds that demonstration helps to set standards for the operations. For effectiveness, demonstrations should be conducted by capable persons in order to show the correct procedures (Fraser et al., 1993).

For effective learning of a skill, demonstration method is

always followed by performance step. Chamberlain and Kelly (1981) and Curzon (1990) are of the opinion that in performance or practice, skill acquisition will grow from directed teaching and practice. Through practice, the student acquires speed and proficiency in carrying out the task. When students practice using the cutting machine or preparing markers on the computer, they acquire speed and proficiency; and workmanship improves. Demonstration and practice are important as they establish in learners correct patterns of response (Curzon 1990). Through demonstration, expected standards of performance are established. Repetition of demonstration can help correct any errors by giving students an opportunity to see the skill being taught.

Industrial attachment

Brubacher (1982), Nkiwane (1983) and Frantz (1997) say that, the practice of a technology is essentially an art and as such it can be learnt in the context of its practice on the job. This implies that, the place for clothing students to learn about clothing is in the clothing industry. Furthermore, Wertsch and Terwell (1999) present the pragmatist view that, students should play an active role in acquiring knowledge and skills. Meaningful learning takes place in meaningful contexts in what are called communities of practice. In the clothing field, clothing factories can be considered as communities of practice. Students acquire knowledge and skills as they design and construct garments in clothing factories whilst on industrial attachment.

Hoffman (2004) puts forward the view that industrial attachment is a three way partnership between industry, students and college. He is of the view that through industrial attachment, industrialists are able to influence change and become knowledgeable about current educational thought. Chowdry and Sudha (1995) say that industrialists get an opportunity to train trainees as per their requirements in terms of skill training and latest technology. Moreover during the field practice, an industry can identify students who are highly talented and skilled in designing and pattern making for employment.

Surya (2004), Hoffman (2004) and Chikomba (2007) are of the view that industrial attachment allows students to apply and integrate their technical knowledge and skills in a real environment. Through attachment, students participate in computer aided pattern making and design and assembly line. Moreover industrial attachment provides students with an opportunity to develop acquaintances with employers, hence increases their chance of employment. Students also get acquainted with new gadgets and equipment along with their usage; for example computer aided design/computer aided manufacture (CAD/CAM). Students get a chance to learn skills as per requirement of the employment sector (Matseke 1997).

In view of the above, colleges should have programs that

meet needs of industries. This helps colleges to produce work ready graduates (Chikomba, 2007; Chowdry and Sudha, 1995). At the Polytechnic, the students of the national certificate in industrial clothing design and construction course go on industrial attachment for one year (Higher education examinations council 2005). Hoffman (2004) also indicates one year as a reasonable period for students to go for industrial attachment.

METHODOLOGY

Design

The research used a case study of the qualitative paradigm. A case study design was chosen for its uniqueness in that it provided a study of the phenomenon in its natural setting (Hitchcock and Huges 1989; Leedy 1997). The natural setting helped in understanding events and processes involved. The research was carried out as a case study of a Masvingo Polytechnic in Zimbabwe. Leedy (1997) refers to the case study as a type of qualitative research in which a researcher explores a single entity or phenomenon bounded by time and activity and collects detailed information using a variety of data collection instruments. Borg et al. (1993); Leedy (1997); Leedy and Armrod (2005), support the study of a particular case.

Sample

A sample of 19 respondents was considered small enough to be meaningful. Leedy and Armrod (2005) say a small sample is what is recommended for qualitative research as data collection methods are time consuming and can be expensive. Convenience sampling was used to select 10 second year students, 5 production managers. The research selected students and production managers in industries located close together to minimize time and financial costs. Marshall and Rossman (1989) support this form of sampling when they say sample selection must be planned around practical issues such as costs and researchers comfort. Moreover, purposive sampling was used to select 4 lecturers who teach subjects involving practical work namely: Industrial pattern techniques, Industrial sewing techniques, Garment design and Factory techniques.

Data collection instruments

According to Marshall and Rossman (1999), qualitative researchers rely mainly on four major methods of gathering information such as participation in the setting, direct observation, in-depth interviewing and analyzing documents. In view of this, the study used interviews, observation and document analysis to collect data. Use of a variety of data collection instruments brings about triangulation (Lansley 1993, Lennings 1985).

Interviews

The three groups of respondents were interviewed. The interview was used because it is a direct approach of gathering data on what a person knows, likes, values, thinks, his/her attitudes, interests and what a person has experienced (Smith, 1995). A semi-structured interview was used. The interview accommodates all types of questions, extensive probes to get information and more lecturers on their views on demonstration and industrial attachment clarification on issues. The interview was used to collect data from

as strategies for effective teaching of skills and competences in clothing. Industrialists and students were interviewed to find out if industrial attachment was a useful strategy in training students. The interview allowed the respondents to express their views on issues under investigation.

Observation

The observation method is useful in digging below answers to verify results of an interview or questionnaire. Best and Khan (1993), Cohen and Manion (1994) and Neuman (2000) present two observation methods: participant and non participant observation. Non participant observation method was used; it is the recording of events as observed by an outsider (Leedy, 1997; Neuman, 2000).

Document analysis

Neuman (2000) says document analysis involves scrutinizing relevant documents, written or printed matter, verbal or in pictorial form. The analyzed documents were the industrial attachment log book and regulations and syllabus. The log books were checked to see how students were performing in the different departments. The course regulations and syllabus document were studied to find out suggestions on demonstration and industrial attachment as strategies in implementing the clothing curriculum.

Data collection procedures

One interview and two lecture observations were made. A visitation schedule was prepared for the industrial visits. A total of four visits per factory were done. The first visit was a familiarization visit. During the second and subsequent visits, students were observed and interviewed in the departments. Industrial logbooks were assessed on the second and fourth visit. Production managers were also interviewed on the second and fourth visit. To collect data from lecturers, one interview and one lecture observation was conducted per respondent.

Data presentation and analysis

Information gathered through interview, observation and document analysis from the two sites were presented mainly in a descriptive form (Tables 1, 2 and 3). The data were presented, analyzed and discussed basing on research questions.

FINDINGS AND DISCUSSION

The findings and discussion were based on the themes which emerged from the research questions.

1. Evaluation of demonstration as a tool for acquiring skills and competences.
2. Evaluation of industrial attachment as a tool for the acquisition of skills and competences.

Demonstration as a strategy for acquiring practical skills

The first research question read:

How does demonstration method contribute towards

Table 1. Interview responses on demonstration.

Theme	Student	Lecturer and production manager
Purpose of demonstration	<p>When a skill is demonstrated practice is easy. One can easily do the practical.</p> <p>Demonstration helps me to produce good quality work.</p> <p>They show me the quality of work required by lecturers.</p> <p>It makes practical work easy.</p> <p>I prefer being taught something practically through demonstration.</p>	<p>Demonstrations help in that mistakes and wastages are avoided. Students see exactly what is expected. We want to avoid rejects especially for exports.</p> <p>You cannot afford to have flaws on garments. It is a waste of resources. This is why it is important to demonstrate to students how skills and processes should be done.</p>
How often is the demonstration used?	<p>If we come across a skill or process for the first time, our lecturers usually show us how it is done through a demonstration.</p> <p>Here, in industry where we meet unfamiliar machines for the first time, demonstrations are always conducted. This is done so that we might not damage the machinery.</p>	<p>When a student is taken to a department for the first time, e.g. cutting department, use of every piece of machinery is conducted. Students practice use of machinery before being allowed to handle customer orders.</p> <p>Students are always exposed to processes through demonstration. They then practice until they are perfect in the process. Only then are they allowed in the production line.</p>
Challenges experienced during demonstration.	<p>At times too much of verbal explanation to compensate for lack of machinery.</p>	<p>Wastage of materials when students use machinery for the first time.</p> <p>Difficult to meet production targets in departments where students are attached.</p>

Table 2. Interview responses on industrial attachment.

Item	Lecturer	Student	Production manager
Purpose of industrial attachment	<p>-it is good to have industrial attachment since we do not have special machines at college. Students learn to use these machines in industry.</p> <p>-industrial attachment is important/ useful because it exposes students to the skills as applied in industry</p> <p>-industrial attachment helps our students to apply their technical knowledge in a real work environment.</p> <p>-students say sometimes they are denied the chance to participate fully in some departments e.g. tailoring for man's wear.</p>	<p>-industrial attachment helps us to get to know employers' expectations. It increases our chances of getting employed/ jobs.</p> <p>-on attachment we get an opportunity to use machinery not found at college.</p> <p>-it gives us the opportunity to learn about the clothing industry i.e. how it works and skills and processes required.</p>	<p>-industrial attachment gives us the opportunity to train students according to our requirements.</p> <p>-industrial attachment helps us as industry to identify top graduates saving money on recruitment.</p> <p>-involving students in the production line especially at the beginning is difficult. We fear wastage of resources when students are practicing to use machinery for the first time.</p>

Table 2. Contd.

Challenges experienced on industrial attachment	-it is difficult for students to effectively develop skills competences when they are attached to someone with a very low educational level. It is difficult for such people to explain how things are done and why they are done in a particular manner.	-sometimes we would spend time in areas where we would not learn much like the cleaning department. -sometimes it was difficult to learn from a machinist with a low level of education. They had problems explaining some of the skills. -sometimes due to lack of experience we were not given the chance to experience some of the challenging activities especially in the export lines.	
Roles	-placement of students. -preparing students for attachment. -assessment of students on attachment.	-familiarize with industry set up. -practice skills learnt at college.	-hosting students. -mentoring. -supervising students. -assessment through logbook.

acquisition of skills and competences for clothing industry. The literature has shown that demonstration is considered as a basic method for teaching skill type subject matter (Chamberlain and Kelly, 1981; Curzon, 1990; Bango et al., 1997; CACC, 2000). Correct patterns of response are established in the learner through a demonstration. One of the lecturers interviewed said “A demonstration clearly shows students the skill to be learnt and the expected standard of performance”. Another lecturer interviewed said “A demonstration is helpful in acquiring skills because it clearly shows the student how the procedures are done. This gives students a standard measure for their work”. A demonstration clearly shows what is to be done, for example preparation of a jet pocket. This was reflected by a lecturer in the interview who said, “It’s easier to understand how a process is done when it is demonstrated. It’s difficult to understand the process if it’s just explained or written down like working a jet pocket.” Demonstration is effective as it involves many senses e.g. touch, sight, sound (Gatawa, 1990; Newbury et al., 1996). Demonstration clearly presents ideas and provides students with hands on-experience. In a lesson observed on grading of a blouse pattern, students were able to practice easily demonstrated techniques on grading. Through demonstration, the students see how a technique like sleeve insertion is done. The expected level of operation

is also shown through a demonstration, setting the standard for practical work.

The research findings and literature shows that, practice by students after a demonstration was a useful strategy for acquiring skills and competencies (Curzon, 1990; Chamberlain and Kelly, 1981; Newbury et al., 1996; Reece and Walker, 2003; Arends, 1997). In practice, skill acquisition will grow from carefully directed teaching and practice. As an interviewed lecturer pointed out, “Practice is also important as it helps students master skills taught”. The production managers also emphasized the importance of supervised practice. For this reason, they attached students to skilled and experienced personnel. Clothing manufacturing is a practical field where skill acquisition requires hands on approach where students engage in practical work. The researchers observed that in an industrial sewing techniques lecture, the quality of supervised practice was lowered by limited machinery; fifteen students were sharing one over locker, and three students one lock stitch machine. One interviewed student said, “Practicing is difficult because machines are few. We waste time waiting to stitch on the machine”. In pattern making and design, demonstrations were immediately followed by practice by students as there were adequate materials and equipment. Through practice, students gain proficiency in carrying out practical activities in garment

Table 3. Data collected through observation.

Item	Demonstration	Industrial attachment
Purpose of:	<ul style="list-style-type: none"> -the demonstration showed skills and techniques and procedures to be followed e.g. grading patterns to 4 sizes (2 sizes up 2 sizes down) -showed students expected levels of performance in practical work e.g. width of the binding pieces. -the demonstration set the standard for practical work for students as observed at industry in the assembly line and at college for students' practice 	<ul style="list-style-type: none"> -exposed students to machinery which they used in the production of clothes. - researchers observed students using machinery which was not available in college (see Table 3). Industry had the machinery stipulated in the regulations. -students had the opportunity to use CAD/CAM (not available in the polytechnic) to design and make patterns.
Duration of / time needed for / organization of:	<ul style="list-style-type: none"> -difficult processes like grading were demonstrated in stages i.e. step 1 grading points, step 2 grading down step 3 grading up. -some activities were time consuming e.g. working buttonholes, some difficult processes like working a jet pocket took 15 minutes - students at times were organized into groups where students had to watch at close range 	<ul style="list-style-type: none"> -students were on attachment for one year. -students were attached to different departments. Moving from one department to the other. -students spent approximately four weeks in each department. -students were assessed in each department and assessment was recorded in the log books.
Role of lecturer/production manager during:	<ul style="list-style-type: none"> -lecturers/ industry personnel demonstrated each techniques to be applied e.g. zip insertion, cutting. -setting up of demonstration area and materials and equipment to be used -involving students in demonstration through questions, discussions and asking students to demonstrate to other to other students. 	<ul style="list-style-type: none"> -guide students through the production processes in industry. -supervise students in the performance of tasks in the various departments. -assess students on industrial attachment for certification.
Role of students during :	<ul style="list-style-type: none"> -observing what is being demonstrated. -ask questions to seek clarification. -explains procedures demonstrated to others. -sometimes demonstrates to other students. Engaging in performance step to demonstrate what has been shown/ learnt. 	<ul style="list-style-type: none"> -demonstrate use of machinery in different departments i.e. designing, cutting, production line, pressing, finishing etc. -demonstrate application of different skills in the various departments.
Challenges	<ul style="list-style-type: none"> -grading and marker making was only done manually with reference to CAD/CAM theoretically. Computer grading was not done due to lack of facilities -demonstration of jet pocket using jet machine was not done due to lack of machinery. 	<ul style="list-style-type: none"> -student demonstrations were minimal probably due to lack of experience in use of machinery. -explaining of processes was difficult for some of the industrial personnel due to low level of education. -minimal practical involvement especially in cutting department because of fear of wastage of materials. .-the same was observed in CAD/CAM in preparation of markers, industrial personnel in some companies demonstrated whilst students watched

manufacture. It was noted from the logbook analysis that student performance in production lines improved with practice.

The research findings and literature showed that to be effective, demonstrations and practice needed to be supported by appropriate technologies for example, machinery for use in carrying out different processes in garment manufacture (Newbury et al., 1996; Curzon, 1990). The polytechnic needs to be well equipped with appropriate machinery for effective supervised practice to take place. Since skill acquisition is an active process, it should be supported by relevant media (Oliva, 1992; Newbury et al., 1996; Curzon, 1990, Peresu and Nhundu, 1999). This may imply that effective practice should be supported by relevant media. Lack of relevant facilities may result in work being covered only theoretically. For effective learning to occur, clothing theory should be supported by practice. It was noted that in some areas like industrial sewing techniques, equipment was inadequate for effective practice; students would share one over locking machine. In designing and pattern making, topics like computer aided design and manufacture were covered in theory as computers with these programs were not available. This situation impacted negatively on skill acquisition (Curzon, 1990; Newbury et al., 1996).

Industrial attachment as a tool for skills acquisition and competencies

Findings from the course regulations and literature show that, industrial attachment was considered an important component of training (Higher education examinations council, 2000; Hoffman, 2004). Industrial attachment is beneficial to industry and college (Hoffman, 2004; Brubacher, 1982; Nkiwane, 1997; Frantz, 1997).

The findings indicated that industry benefitted from industrial attachment as one production manager pointed out, "We as industry train students according to our requirements and standards"; this means that clothing students are trained to meet the requirements of the employer when on attachment (Chowdry et al., 1995). They are taught how to effectively operate a variety of equipment and to meet the quality standard of work expected especially for export products.

The study has also shown that industrial attachment is beneficial to students, as they are able to apply what is learnt at college in an industrial setting, which help them acquire first hand skills and knowledge of the clothing industry. This finding is supported by Nkiwane (1993) and Brubacher (1982) when they say a skill can be learned in the context of its practice. As an interviewed lecturer pointed out, "During industrial attachment the student gets the opportunity to practice what they have learnt at college in a real life situation. This makes learning realistic". This means that during industrial attachment

students get the feel of an assembly line, at college they do not come across a factory setup.

One of the lecturers interviewed expressed that, "It is a good idea for students to go on industrial attachment since we do not have special machines and equipment; they learn to use machines in the production line and get the feel of how industry works". The lecturer thought attachment as important as it exposes students to machinery not available at college for example, CAD/CAM. Students have the opportunity to see and use equipment they had covered theoretically at college. This makes skill acquisition for industry more effective (Chowdry et al., 1992; Chikomba, 2007; Wersth and Terwell, 1999; Hoffman, 2004; Surya, 2004). In the case of polytechnic studies, students covered computer aided design and manufacture (CAD/CAM) in theory and come across these computer programs in industry. Industrial attachment helps them to put theory into practice.

Lack of practice at college resulted in some students being exposed to simple operations. An interviewed college student said, "We were not allowed to use computers for grading and marker making. The management felt we were inexperienced and would damage the computers. We were allowed to watch." Due to limited practice or lack of exposure to some equipment at college, student could not fully utilize the facilities at industry. Practice helps students to be proficient in a skill (Curzon, 1990; Hoffman, 2004).

In summary, the findings show that effective acquisition of skills and competences in a technical field like clothing requires practice. Strategies like demonstration, supervised practice and industrial attachment support acquisition of practical skills. In some cases students did not adequately benefit from industrial attachment as they were not allowed to operate in some areas. In some factories students were not allowed to work on export lines. The industrialists feared producing substandard garments. In some cases students would be involved in menial jobs like cleaning of garments for several weeks. This meant exposure to high level production skills was minimal.

Conclusion

In conclusion, the success of a clothing curriculum depends on, among other things, the strategies used in its implementation. Basing on the findings, it may be concluded that demonstration is a critical strategy in acquisition of practical skills and competences. Demonstration clearly shows what is to be done and sets standards for practical work. Through practice, a student becomes proficient in practical tasks. The study has shown that for effectiveness, demonstration and practice should be supported by relevant technologies to enhance instruction. The study has shown that demonstration method is an effective strategy for teaching and learning

of clothing. However at the Polytechnic its effectiveness is sometimes negatively affected by lack of or inadequate machinery and equipment.

With reference to industrial attachment, the conclusion is that, it is useful in furnishing and broadening students' skills and competences for the clothing industry. Industrial attachment helps student to apply what is learnt at college in a real work environment. Industrial attachment also helps to link Polytechnics with the employment world. However in some cases students did not fully benefit from industrial attachment as they did not practice in computer aided design and manufacture or export lines. This limited the skills and competences gained by students during industrial attachment.

Recommendations

The study came up with the following recommendations:

- 1 Polytechnic could make use of at least two phases of industrial attachment instead of one phase. This would help students familiarize themselves with facilities and equipment to consolidate what would have been learnt at different stages of the course.
- 2 Industrialists should allow students to use equipment not available at the Polytechnics by teaching them how to use these through demonstrations by skilled personnel.
- 3 For effective demonstrations and practice, Polytechnics should provide technologies that support instruction.
- 4 For effective practice, Polytechnics should have adequate equipment to ensure ease access by students during practice.

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