

Research Article

Institutional Dynamics and Skills Acquisition in School-Based Jewellery Education in Ghana

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Abstract: School-based jewellery education in Ghana started at Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana, in 1968. Jewellery graduates are expected to practice as jewellers in Ghana's jewellery industry. However, available information indicates that most jewellery graduates do not pursue careers in jewellery. The purpose of the study was to examine the institutional dynamics and skills acquisition of school-based jewellery education in Ghana. Against this background, the researchers sought to answer the research question: What are the processes and challenges involved in teaching and learning jewellery in school-based jewellery education in Ghana? The study adopted the mixed-methods research approach, with descriptive and evaluation as the main research methods used. A population of 90 respondents was drawn using total purposive and convenience sampling techniques, with observation, interviews, and questionnaires as data collection tools. Concern that most graduates of school-based jewellery education are not able to practice as jewellers is not a result of students not being trained well as jewellers; rather, the career paths of those jewellery graduates may be different.

Keywords: vocational education, visual art, jewellery, jewellery education, metal product design

1. Introduction

The essence of education is to transform people's minds to acquire the capability to change their environments to improve their quality of life. Generally, education occurs in diverse ways and settings, such as in the family, at home, in the community, at the workplace, at apprentices' workshops and in school. The paradigm shifts in Ghana's education system after independence saw the introduction of technical and vocational education (Adams, 2008). Jewellery education happened to be one of such vocational education programmes that emerged from the paradigm shift. Jewellery is offered at the second cycle and tertiary institutions in Ghana. Among the institutions that offer jewellery programmes are Labone Senior High School, Kinbu Senior/Technical all in Accra, AsanSka College of Design and Technology, Accra and Kwame Nkrumah University of Science and Technology in Kumasi (Fening, 2015).

Meanwhile, concerns expressed by some players in the jewellery industry is that most students who acquire jewellery education through the school-based programme at the Metal Product Design Section (MPDS) are not able to practice as jewellers after graduation (EK Asante-Asare, personal communication, 20 March 2014). According to Atchoarena and Delluc (2001), some key challenges in school-based vocational education such as jewellery training

include the mismatch between skills that students acquired while in school and the jewellery industry's needs. There is also a widespread worry about the quality of their training in schools and the training environments, as well as negative public attitudes and perceptions towards jewellery education in Ghana. Again, Atchoarena and Delluc assert that the time allotted to the theoretical components of training outweighs the practical period.

These shortcomings in the school-based system give an opportunity to some students to cheat the system by outsourcing their practical course works for marks making them lose the essence of going to school to acquire knowledge and skills to practice jewellery effectively after graduation. The study, therefore, sought to examine the institutional dynamics and the processes involved in acquiring jewellery making skills through the school-based jewellery education system in Ghana. Against this background, the researchers sought answers to the research question, what are the processes and challenges involved in teaching and learning jewellery in school-based jewellery education in Ghana.

2. Literature review

2.1 Education

One may not be far from the truth to allude to the fact that the stories of civilization and education are almost the same. This demonstrates that education is a vital component of the life of all human beings. The development of humanity as a complete being requires education as a fundamental mechanism and a very important tool for fast-tracking the wellbeing and prosperity generated by educational light (Parankimalil, 2012). There are diverse educational disciplines through which individuals can be developed, and one of such disciplines is jewellery. Well-known educational philosophers have defined education in four ways. These include things that parents, teachers and schools do to the young ones. The second one is the activities that a child goes through are said to be education. That of the third definition given is the gains the child makes after going through some activities and also enduring what parents, teachers and school do to them is also called education. Lastly, the deed that offers the child to acquire a body of knowledge is education (Frankenna, 1965).

To sum it up, it will not be farfetched to conclude that the definitions and opinions on education by scholars point to the fact that their personal biases come to bear in their quest to define education. Despite this observation, education may be the activity that leads to independence and integrated personality development. It involves training and acquisition of special skills, knowledge, attitudes and values needed by an individual to be responsible which would enable him/her to contribute his/her own quota to the growth of the society of which he/she is a member.

Education was brought to Gold Coast now Ghana, by the colonial masters. The system of education introduced to Ghanaians was the kind that was geared toward training administrators and economists for countries other than Ghana (Iddrisu et al., 2014). This could mean that those who brought education were not interested in giving Ghanaians the kind of education that could have positioned them to transform their natural resources to develop Ghana. Kautilya, an Indian philosopher, royal advisor, professor of economics and political scientist is reported to have said, "Education is an investment in human capital and it can have a great impact on nation's growth and development" (Kaur, 2014). In this regard, Ghana continues to dedicate a lot of resources to the education sector, with the country committing about 6% of its annual GDP to education.

Ghanaians, having gone through the British colonial administration's education structure for 17 more years after independence, came to the realization that Ghana as a nation is endowed with so many natural resources but these resources do not inure to the full benefits of the people of Ghana, because the natural resources are exported in its raw form. To overturn this situation, the country decided to make a major paradigm shift in its education system from the colonial system of education. Three of the most recent major education reforms since 1974 are Dzobo 1974 Education Reform, Evans-Anfom 1987 Reform and Anamuah-Mensah 2007 Reform (Poku et al., 2013). Architects of these education reforms argued that human capital formation was recognized as critical to the growth and development process, hence, these reforms. Although the reasons that underpin these three educational reforms were virtually the same, challenges associated with the implementation of the recommendations made by the reform committees accounted for these different reforms.

2.2 School-based education in jewellery education in Ghana

Jewellery has been a form of visual communication from the start of human history, as it assumes forms of personal adornment while it projects a type of symbolic status up to the position of kings and emperors. Game (1997) puts it as;

“...the power of jewellery {to} [that] explores issues of identity and personal narrative is second to none.

Every time we put on clothes and select a piece of jewellery to wear, each one of us makes a very conscious statement about ourselves and the society to which we belong” (p. 15).

Jewellery is taught and learnt at two levels of Ghana’s educational system. These are second cycle (Senior High School-SHS) and tertiary (colleges or universities). Whereas the SHS level treats jewellery as a subject under the visual art programme, those at the university treat it as a programme to the extent that some tertiary institutions run bachelor’s and master’s degrees in the field of jewellery. For example, AsanSka College of Design and Technology which is located in the capital city of Ghana runs a Bachelor of Arts in jewellery design technology whiles KNUST in Kumasi runs Bachelor of Fine Arts and Master of Fine Art Jewellery and metalsmithing programmes respectfully.

2.3 Jewellery education in tertiary institutions in Ghana

Fening (2015) asserts the training of jewellers which was done through an apprenticeship system saw a new dimension in the 1960s. The new system of training started when goldsmithing and silversmithing were then introduced as a programme of study to Kumasi College of Technology, Kumasi. The introduction of jewellery to the high level of education has contributed significantly to the workforce of the jewellery industry. Among the changes that the introduction of jewellery brought into the jewellery trade was that the once forbidden trade for women has now been opened up to them to learn and practise as jewellers. Currently, the number of institutions that offer jewellery keeps increasing. Some of the new schools are AsanSka College of Design and Technology and Wa Polytechnic. Also, Takoradi Technical University is in a far advanced process of introducing jewellery to their programmes. With various interests being shown in jewellery in recent times and KNUST offering both bachelor’s and master’s degrees in Jewellery, one can, therefore, project to a brighter future for the jewellery industry.

3. Method

The study builds upon other studies carried out on Ghana’s informal skills acquisition systems to explore the caliber of jewellers produced by the MPDS, which is a section within the industrial art department in KNUST. The study was based on descriptive and evaluation research methods. The basis for using these two research methods was the fact that they utilize elements of both qualitative and quantitative data approaches within the study as a means to establish answers to the ‘whats’ and ‘hows’ of the research questions. Table 1 shows the population for the study.

Table 1. Matrix of the population for the study

No.	Population	Target population	Accessible population
1	Lecturers of MPDS	6	6
2	Students of MPDS	82	82
3	Retired MPD lecturers	4	2
	Total	92	90

The researchers choose to examine the sample size of 90 because the numbers were not too large and the fact that such samples have specific experience, knowledge, skills and exposure to the school-based jewellery programme

(Bernard, 2002; Lewis & Sheppard, 2006; StatTrek, 2016). Data collection was done through the use of observation, interviews and questionnaires (Appendices 1-3). The level at which these instruments were used is presented in Table 2.

Table 2. Distribution of data collections tools used

Observations	Interview	Questionnaire
Metal product design section	MDP lecturers	MPD students
	6	82
	Retired MPD lecturers	
	2	
1 Institutions	8 Lecturers	82 Students

A number of mixed methods were conducted to analyse the data that the researchers collected from the lecturers and students of MPDS with the data collection tools in addition to the secondary data which was the curriculum of the Metal Product Design (MPD) programme. The qualitative data which were gathered through observation and interviews of past and present MPD lecturers were grouped. The analysis of the raw data was preceded by transcribing all the interviews that were recorded into workable transcripts. Three cycle coding methods were used (59 codes, 24 categories and 6 themes) with the assistance of HyperResearch software. Examples of the codes that were generated include school-based jewellery education.

The quantitative data refers to the data that were collected through a questionnaire that was given to the MPD students to solicit their views. Just as the researcher treated the qualitative data, Statistical Package for the Social Sciences (SPSS) was used to organise and analyse the quantitative data. The researcher focused on the use of descriptive statistics which aimed to summarize the data set quantitatively to ascertain the frequency distribution. This was due to the proximity of the students' numbers which were not too large to deal with. This also resulted in the use of descriptive statistics rather than inferential statistics. Descriptive statistics refer to the use of basic features of data in a study to describe the general tendencies such as percentage, mean, median and mode in the data (Trochim, 2006).

The purpose of using descriptive statistics but not inferential statistics was to allow the researchers to summarize the data with the purpose of using basic statistics, such as frequencies, mean and standard deviation to describe what occurred in the sample, aside from the fact that the students' population was not that large. Discussion and presentation of findings were done descriptively and supported with tables, figures, diagrams and plates. The study is situated in the pragmatism and constructivism paradigms of philosophy. In that, knowledge and skills are constructed by learners through the practical process of development. In a like manner, jewellery education in Ghana is considered a social practise with the assumption that there is meaning in the actions of the teacher and the learner that require understanding within social contexts. According to Fosnot (1989), research can be considered constructivism if it is based on the principles that learning in an important way depends on what people already know; new ideas occur as people adapt and change their old ideas; learning involves inventing ideas rather than mechanically accumulating facts, and meaningful learning occurs through rethinking old ideas and coming to new conclusions about new ideas which conflict with the old ones.

Invariably, learners are the builders and creators of meaning and knowledge through practical activities which fall in line with Dewey's statement that knowledge is made up of warranted assertions that result from taking action and experiencing the outcomes. This reflects the ontological and epistemological influences on the research design. The ontology gave rise to two extreme positions that are "reality" and "truth". In reality, the researcher means the condition of graduates who acquire jewellery education in Ghana through school-based or apprenticeship programme, and "truth" in this sense, refers to the actual processes involved in teaching and learning jewellery in Ghana as specified in the MPD curriculum and the activities of the jewellery apprenticeship programmes.

The researchers adapted Pavlin's (2011) comparative study of VET systems in Europe as shown in Figure 1 to design the conceptual framework for the study (Figure 2).

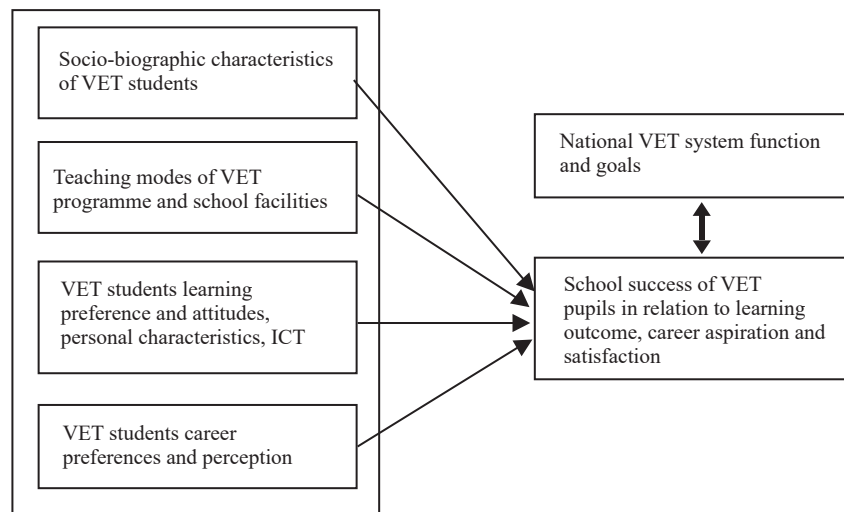


Figure 1. Theoretical framework of Pavlin (2011) adapted for school-based programme

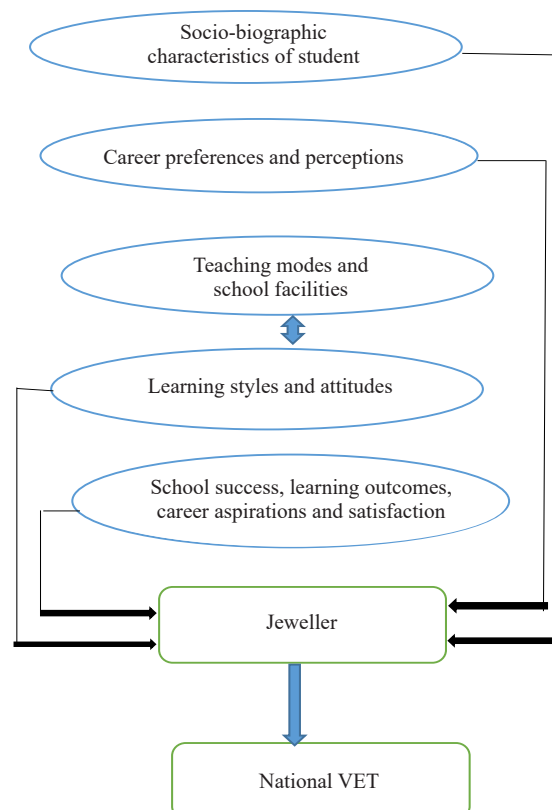


Figure 2. Conceptual framework for the study

4. Results and discussion

4.1 *Profile of metal product design section and the characteristics of the respondents*

The present Metal Product Design Section at the KNUST is the foremost institution where school-based jewellery education began in Ghana. It was then established as a goldsmithing and silversmithing department at Kumasi College of Technology during the 1963/64 academic year by a German expatriate. It was to train highly skilled craftsmen who were to add value to the various precious mineral resources in Ghana. The first student intake was one person and increased in the following year to three students. After the third intake of students into the department, no other student was enrolled for the following two academic years due to the refusal of the authorities at that time to renew the contract of the German expatriate with the university after the expiration of the first 4-year contract. The truncating of the programme in the 1967/68 academic year compelled the authorities to share the prospective goldsmithing and silversmithing students with other art programmes. This action nearly caused the collapse of the department but the shared effort of some of the pioneer graduates who were appointed as assistant lecturers to hold forth in the department helped in enrolling students in the programme again. Since that time, the department has continued to admit students to pursue the jewellery programme. Hitherto, the department used to enroll students whose numbers (between 2 and 10 students) were convenient for teaching and learning looking at the facilities at the time.

The emergence of the educational reform which brought into existence the senior secondary school system of education has increased the number of students who enroll to pursue the programme in recent times. For the first time in the history of the programme, 30 students were enrolled in the 1996/97 academic year. This trend has continued, where at a point in time the number of students admitted to the programme exceeded 60 students. The increasing population of students in the programme necessitated its transformation in various ways. The programme which had its own department at its inception now has been brought down to the sectional level under the industrial art department within the faculty of art. Aside from that, the title of the programme which was goldsmithing and silversmithing is now Metal Product Design.

The MPDS at the moment runs both undergraduate (bachelor's degree) and post-graduate (Master of Fine Art-MFA) degrees in jewellery and metalsmithing. The rationale behind the present-day MPD programme is to train students in the unique discipline of metal crafts (jewellery/metalsmithing and MPD) in order to derive substantial benefits from the viable domestic metal industry, especially, value addition to raw material resources such as gold, silver and diamonds. The programme is practically orientated in order to build students' knowledge and understanding of metals art, thereby producing future practitioners and academics in the field.

4.2 *Demographic of lecturers and students respondents*

The characteristics of MPD lecturers that were interviewed by the researcher were 5 males with positions as lecturers in the university. The other person was a female who holds the position of senior lecturer at the university. It also emerged from the study that 5 (6) hold the academic qualification of master's degree while 1 (6) holds a PhD. Among the master's degree holders, 2 of them studied MFA jewellery and metalsmithing, and another 2 studied MA. Art Education and the 1 Master of Philosophy (Mphil) Art Education. The study also revealed that 3 of the interviewees have taught at the MPDS between 10 and 17 years while another 3 have taught between 5 and 9 years. Apart from the interviewees being lecturers, all of them also practise as jewellers. Among the interviewees, 3 have practised jewellery for more than two decades while another 3 have also practised jewellery for over a decade. Another 2 interviewees were made up of a retired lecturer and a lecturer who taught jewellery at the MPD section for 33 and 25 years respectively.

On the part of the students who took part in the study, they were made up of second to the fourth year. It emerged from the students' data that a total of 78 out of 82 responded to the questions on the questionnaire. They were made up of 30 in Year Two, 17 in Year Three and 31 in Year Four. The gender distribution of the students was made up of 66 (84.6%) males and 12 (15.4%) females while their ages were 2.8% for those who were the ages 16-18 years, and 42.1% falling within the ages of 19-21. However, the majority (57.8%) of the students were aged 22 years and above.

4.3 Findings from the observation

Processes involved in teaching and learning of school-based jewellery education

Findings from the observation made on lectures (teaching and learning) at the Metal Product Design Section of KNUST

Course Title: Metal Joining Processes

Course Code: IAM 263

Credit Hours: 3 (1-hour Theory and 2 hours Practical)

Level: Year Two, Semester One

Topic Taught: Soldering and Soldering Methods

The number of students who attended the course was 32, which means that all students attended the course. The women were eight (8) and the men were 24. The class took place in the classroom of the second year, which doubles as a studio. The course which was 3-hour started at 1:30 p.m. and concluded at 4:30 p.m. There was a one-hour (1) section for theory and a two-hour (2) section for practicals.

Strengths observed

These are:

- i. The lecturer showed that well versed in the knowledge and skills of soldering and soldering.
- ii. Based on the composition of the credit hours, the lecturer taught the theory before the practical.
- iii. The lecturer took the students to classroom learning through motivational exercises, appreciation and critical exercises.

Weaknesses observed

These are:

- i. The teacher's approach to teaching the topic on the day was largely teacher-centred. This lowered students' contribution to the teaching and learning of the topic. The students were mainly receivers because there was no instance where the lecturer put an issue concerning soldering and soldering methods on board for students to discuss either as individuals or in groups.
- ii. The content was sequentially organized but overloaded, which prevented the lecturer from teaching more soldering methods, especially the practical component.
- iii. Teaching both theory and practical was done in the classroom which also served as a studio. The classroom had limited chairs and tables for students which made some of them share seats and tables.

4.3.1 Motivating factor for studying jewellery

One important concern that has a great effect on skills training programmes such as jewellery is the number of students that a lecturer teaches. In this regard, the researcher sought the number of students that are there in each of the year groups in the MPDS. The responses as indicated by the interviewees were that there were between 30 and 60 students in a class. Three of them added that the capacities of the classes have been rising as the years go by. Interviewee L4 stated that the main jewellery studio of the section which was designed for 15 students is now accommodating over 50 students. It emanated from the interview that the large student population in the MDP section makes it very difficult to teach practical courses. This was supported by 3 other lectures.

Jewellery is an area where people venture based on certain instincts. On that score, the researcher set out to find from the students the catalyst that propelled them to study jewellery. The results of the investigation as shown in Table 3 revealed that 24 out of the 78 respondents decided to study jewellery because of the careers that are associated with it. Again, another 14 of them said their decision to pursue jewellery was informed by the fact that the programme provides a good foundation for further education. Besides these two reasons, there were those (11) who said their previous examinations grades prevented them from pursuing their preferred programme; hence, they had no option but to opt for the jewellery programme. Furthermore, 10 argued that their former teachers encouraged them to enroll in the programme. Notwithstanding the above-mentioned factors, two (2) and three (3) respondents claimed that it was

their parents and friends respectfully who encouraged them to pursue the programme, whereas 4 of the subjects did not respond.

Table 3. Factors that influence respondents' selection to study jewellery

Reason for selection	Frequency	Percentage(s) %
Education	24	30.8
Occupation	24	30.8
Examination results	11	14.1
Parents influence	3	2.5
Friends	2	3.8
Teachers	10	12.9
No response	4	5.1
Total	78	100

The characteristics of the MPD lecturer respondents were made up of five males who hold the position of lectureship and 1 female who is a senior lecturer at the university. Out of the six, five of them hold master's degrees while the other one holds a PhD. The areas of specialisation for the lecturers were found to be Master of Fine Art in jewellery and metalsmithing (20), Master of Art in art education (2) and Master of Philosophy in African art and culture (1). Three of the lecturers have taught in the MPDS for between 10 and 17 years while the other 3 have between 5 and 9 years of teaching experience in the section. The study also revealed that all the lecturers at the MPDS are practising jewellers with the least practicing for more than a decade while the highest practicing jewellery among them has more than 20 years of experience.

The demographic features of the lecturers that took part in the study suggest that their professional competencies as practising jewellers can be said to be on point. These findings contradict the notion that those who go through school-based training in jewellery are not able to practise as jewellers after school because those who taught them might not have the professional competencies and skills in jewellery. Contrary to this notion, Hill et al. (2005) posit that if one pursues higher education, such a person has invested in human capital where it is expected to produce a dividend that results in inefficiency in terms of productivity to bring up more yield and improved economic wealth. That is, once a person has a higher education and put into practise what they learned, they gain increment in the levels of their knowledge exponentially. The gender of the jewellery lecturers which was dominated by males conforms to the gender of the master jewellers even though there was one female among the lecturers.

The findings of the study as shown in Table 2 also revealed that several factors influenced students' decision to pursue jewellery programme. This means that students who acquire jewellery education do so not necessarily to practise as jewellers after school but as a stepping stone for their desired profession. This buttresses the point made by Ramirez and Dizon (2014) that some students enter higher education sometimes to pursue programmes that are totally different from the kind of vocation they practise in the future. The researchers have the opinion that the fact that graduates from MPD were not practising did not mean they were not trained well but they might have different career paths.

The researchers observed that the number of students enrolled in the MPD programme is 82 with 6 lecturers. Ordinary the lecturer-student ratio would have been 1:13 which could have been appropriate for effective teaching and learning, unfortunately, this is not the case, as every lecturer has specific courses that they teach, meaning each lecturer at the MPD section teaches 82 students. This is because a lecturer who teaches Year Two, Three and Four students with class sizes of 33, 17 and 32 respectively, puts the lecturer-student ratio to be 1:33; 1:17 and 1:32. The average class size of 27 students to 1 lecturer is on the high side for vocational education such as jewellery. With such numbers, it becomes difficult for lecturers to monitor students' behaviour as well as maintain high learners' attention rate, instead, lecturers spend more time teaching the entire class rather than giving individual attention. This situation reflects the

view of Morrow (2007) that overcrowding in class does not allow time for teachers to effectively manage individual attention and make use of participatory teaching and assessment methods. Inadvertently, the high lecturer-student ratio in the MPD section has three implications. There is always a possibility of inadequate transmission of knowledge and disciplinary problems, slow learners may be left behind and suffer while few active students will be able to accomplish the task, and may take advantage to outsmart their teachers by outsourcing their practical coursework to other artisans for marks as the researcher observe lecture 5.

4.3.2 Acquaintance with metal product design curriculum by lecturers

As it is a requirement for any formal education system to have a structured system (curriculum) for teaching and learning, the researcher sought the views of the lecturers about the MDP curriculum. The outcome as emerged from the interview established that all the 6 interviewees indicated they were familiar with the existence and content of the MPD Curriculum. The views of students on the nature of the curriculum for the MPD programme were sought and the outcomes are as follows. A large portion of 70.5% of respondents acknowledged their awareness of the MPD curriculum and are conversant with its content. A small number 5.1% denied acknowledging the existence of the curriculum for the programme let alone knowing its content and 24.4% of the student respondents could not state whether they had read the curriculum or not. Being acquainted with the curriculum of MPD by both lecturers and the majority of the students means that both the teacher and the learner know what they are to do in order to become jewellers after school.

The finding reflects that of Callahan's (2000) position. He is with the view that the heart of any educational activity is exclusively based on the curriculum and instruction that accompanies it. The observation of the researchers is also based on Mouzakitisa (2010) who states that curriculum in the vocational programme (such as jewellery) is the passageway that leads to the training of professional knowledge and skills that enable the drift from concept (theory) to hands-on. With the availability of the curriculum at the disposal of the learner, he/she can predict what he/she is going to learn.

4.3.3 Methods of teaching and learning of jewellery

Four of the six lecturers explained that the methods they usually start their teaching by introducing the students to the theoretical foundation of the topic (jewellery project) and the various techniques and tools required for its execution. They then followed it with an instruction to the students to read on the said topic to gather other people's views and perceptions so what the students learn at the end of the day will not be only the perspective of only the teacher (lecturer) or the student (learner). It emerged from the interviews of the lecturers that the courses they teach are interrelated, an example was cited by L4 who teaches Design, Modelling, Fabrication and Finishing. He alluded that what he normally does was to first take the students through the design course and when he was done, then he would follow it with the modelling so that the learners will practise how to transform the designs into models before the actual item was produced, during the fabrication and finishing course. Respondent L5 said that "the processes of teaching and learning jewellery is a three-stage (design, modelling and fabrication) procedure which require approval from the lecturer after every stage of the processes".

The respondents' briefing on how they teach jewellery encouraged the researcher to find out how often practical activities are organised for students. The findings adduced from responses of all the lecturers show that practical lessons on jewellery are organised for the students according to the schedules on the timetable and mostly weekly. When it comes to the quantity of jewellery produced, the number of jewellery items that each student produced in a semester is based on the kinds of jewellery making techniques that the lecturer wants his students to learn. Meanwhile, a lecturer said his students do one major jewellery project every semester, and the other 5 stated between 3 and 5 jewellery items are made for the practical component that they teach in a semester. This notwithstanding, majority of the lecturers (4 out of 6) indicated the availability or otherwise of tools, equipment and materials also contribute to the pieces of jewellery that the students produce within the semester. Defending the number of items their students produce, L3 said, sometimes when the students are asked to bring particular materials to undertake specific practical exercises, they try to give excuses to avoid the practical work. On the part of the students, the result as it shows that 71 out of 78 respondents attested to the fact that they always take part in the practical lessons with just a few of them (2 out of 78) mentioning that they do not participate in practical activities regularly. Nonetheless, 5 out of 78 of the respondents did not respond.

The researcher, through the questionnaire, sought the frequency in which practical activities are organised with the students by their lecturers. The majority of the respondents (52.5%) stated that they produce jewellery items ranging from three to five per semester as shown in Table 4.

Table 4. Number of jewellery items produced in a semester

Jewellery items produced in a semester	Frequency	Percentage(s) %
0-2	8	10.2
3-5	41	52.5
6-10	15	19.3
Declined response	14	18.0
Total	78	100

The study also recognised that due to the expensive nature of some of the materials for jewellery practical, the lecturers sometimes become a bit flexible in demanding certain materials from students. For instance, interviewee L5 professed that in times when a particular material scarce, he allows the students to go in for an alternative material.

For example, if I wanted students to produce a particular jewellery item in silver, but such material is not readily available for students to use, I allow them to use either brass or copper to produce the item after that the work is electroplated to get the silver colour and the effect that I want the students to learn if they had used silver to produce the same jewellery item.

Students, who are recipients of what the lecturers teach were allowed to assess the performance of their lecturers as far as teaching jewellery is concerned and in a consonant, with the knowledge and skills, they received based on the Likert scale approach. The outcome of the research as shown in Table 5 points out that 19.2% of the respondents said that their lecturers performed excellently and 32% graded their lecturer very well, with a majority which was 43.5% placing their lecturers' performance at good. Meanwhile, 1.2% signified that their lecturers' performance was very poor while 3.8% of the respondents did not respond to the question.

Table 5. Respondents' assessment of lecturers performance

Level of lecturer's performance	Frequency	Percentage(s) %
Excellent	15	19
Very good	25	32
Good	34	43
Very poor	1	1
Poor	3	4
Total	78	100

For a student to go through jewellery training to become a practising jeweller, the person has to go through rigorous hands-on training throughout the person's entire period of training. Teaching and learning methods used by lecturers and students at the MPD section conform to the tried and tested vocational pedagogy which blends hands-on or first-hand

learning with in-depth reflection, teamwork and feedback in a situation where the teacher and the content of what he/she teaches has a strong affiliation. The lecturers adopt direct teaching methods which are particularly effective in helping students to acquire skills. This method of teaching has a well-structured approach that includes the teacher instigating direct interactions usually with the whole class but sometimes with an individual or a small group of students. Other methods that the lecturers use include lecturing, modelling, demonstration, mastery learning, simulation and coaching (Faraday et al., 2011). But where lecturers are not able to teach certain topics due to unavailability of facilities or materials, goes contrary to maxims of teaching where it must be in chronological order.

However, students' assessment of their lecturers does not seem to recognise the efforts of their lecturers as only 43.5% (Table 5) of them agreed that the lecturers' performance is good. This means that lecturers have to improve their teaching methods as excellence is the eventual outcome that the students expect (Mouzakitisa, 2010).

4.4 Challenges confronting effective teaching of jewellery at MPD section

The researcher enquired from the interviewees about the issues that affect the teaching and learning of jewellery section. The responses from all 6 interviewees indicated funding and modern facilities for teaching and learning jewellery as the major problems that hinder effective teaching and learning in the MPDS. In every academic endeavour, one important resource that holds teaching and learning enterprise together is the book. Given this, the researcher inquired from the respondents if they have any jewellery books. As the results in Table 6 show, a majority (80.8%) of the students indicated that they do not have access to any jewellery book with a few (7.7%) respondents indicating that they own some jewellery books. Another facility that is most needed for effective teaching and learning of jewellery is jewellery studio. In a similar finding in the same table, many of the students indicated that they do not have a studio for doing jewellery practical exercises.

Considering the responses by a majority of the respondents, the researcher sought to identify where their practical lessons are held once they said they do not have a workshop. Interestingly, more than half of them said their practical lessons take place in their classroom as it is illustrated.

Table 6. Respondents' view on the availability of books and studio

Resources	No-percentage (%)	Yes-percentage (%)	Abstained percentage (%)
Access to jewellery books	7.7	80.3	11.5
Access to jewellery studio	41	53.8	5.1

Another important resource required for teaching and learning jewellery is the ability of lecturers and students to have regular access to materials. It, therefore, became imperative for the researcher to find out from the lecturers and the students if they have access to materials for teaching and learning jewellery practical exercises and the one who provides them to the students. It appeared from the study that under normal circumstances, the university i.e. the section in the department is supposed to give materials to the students for their training, but unfortunately, this has not been the case for some time now. That responsibility has now fallen on the students to acquire their own materials which are having a serious rippling effect on the academic work. In clarifying this, the respondent said, sometimes when the students are asked to bring certain materials to undertake certain practical exercises, they try to give all sorts of excuses to avoid that particular practical work. The researcher also noticed from the interviewees that with the various challenges that the MDP section is facing, the university keeps on admitting more students onto the programme year in and year out. Meanwhile, the facilities and the number of lecturers remain the same.

Some of the methods that have been proven to facilitate efficient teaching and learning of skill-based programmes are field trips and industrial attachments. Against this backdrop, the researcher sought to establish if the respondents have acquired any experience through field trips and attachments in the course of their studies. The results were that 9 (11.5%) indicated that they have had some attachment before while the majority of 65 (83.3%) said they have not gone

on any attachment and 4 (5.2%) had no response. When it comes to field trips, the result was not much different from their experiences with attachment. This was reflected in the question if the respondent has been exposed adequately to jewellery business and its related activities outside their school environment. The outcome showed that 5% responded in the affirmative, whereas 89% stipulated that they have not embarked on a field trip before with 6% declining any response.

Finally, the researcher wanted to know the reactions of the students if they are given the chance to study jewellery again. Mixed reactions emanated from their responses as it is shown in Table 7. The finding shows that 6 (8%) declined any response; 12 (15%) said they will definitely not choose to study jewellery again, and 24 (31%) said it is likely that they will choose jewellery programme again while 9 (11%) said maybe they will consider it. Affirmatively, 27 (35%) said they will definitely choose Jewellery.

Table 7. Respondents' interest in jewellery

Level of Lecturer's performance	Frequency	Percentage(s) %
Definitely	27	35
Definitely not	12	15
May be	9	11
Likely	24	31
No response	6	8
Total	78	100

According to Adedeji and Owoeye (2002), the contributing factor that propels effective teaching and learning to achieve a high academic standard is based on the availability of appropriate resources (laboratories, libraries, instructional materials and art studios) for teaching and learning. In a similar vein, good facilities (buildings, equipment and learning materials) are expected to lead to better results, partly because having access to good facilities can motivate and empower students to use the equipment to advance the internal learning process. But this is not the case with the conditions in MDP Section as the findings show. A situation where a majority of the students do not have access to jewellery books suggests that students do not have the opportunity to acquire external knowledge on jewellery but have to rely on what their lecturers provide them (Adedeji & Owoeye, 2002).

Lecturers and students also have serious issues with getting materials to teach and learn jewellery. The mode of organising materials for students to undertake jewellery practical replicates and lend further support to similar a study done by Opoku-Asare et al. (2014), who state that when it comes to materials for students to use in undertaking GKA practical "... levying the students and using the monies to purchase the required items every term. In this case, only students who pay are given the items they need for practical assignments for the term". The implication of students acquiring their own materials for practical lessons translates into a low number of jewellery items that the students produce in a semester.

Industrial attachment and field trips are recommended educational exercises that help to strengthen the understanding of concepts that are taught and learned in school. This finding goes contrary to the narrations of the MPD curriculum, which states that,

...the section organises field trips/educational trips for students from which they present reports for assessments. As part of the programme, students are allowed space to conduct independent studies and occasionally take up industrial attachment placement from relevant companies to augment what is taught in the classroom. (MPD Course Description, 2015, p. 63)

5. Conclusion

The study sought to examine the institutional dynamics and skills acquisition of school-based jewellery education in Ghana. Against this background, the researchers pursued the answer to the research question, what are the processes and challenges involved in teaching and learning jewellery in school-based jewellery education in Ghana. The researchers conclude that the school-based jewellery education system in KNUST has a well-structured process for teaching and learning that support skills acquisition in jewellery production. Hence, concerns expressed by some players in the jewellery industry that most students who acquire jewellery education through the school-based system are not able to practise as jewellers after graduation is not a result of the students not being trained well to become jewellers, rather graduates who studied jewellery may have different career paths.

Similarly, the claim that there is a mismatch between skills that students acquired at school and the jewellery industry's needs is unfounded. The curriculum of school-based jewellery education contains the needed knowledge and skills that the students require to practise as jewellers after school.

On the issue of challenges affecting skills acquisition of school-based jewellery education in Ghana, the researchers conclude that lack of resources is causing ineffective teaching and learning of jewellery in the MPDS of KNUST. For instance, the quality of the training environment is nothing to write home about. Comparatively, the negative public attitudes and perceptions towards Jewellery Education in Ghana are born out of the notion that jewellery is a profession that belongs to certain families, for that matter, there is no need to go to a tertiary institution before one can practise.

We, therefore, recommend that institutions that are offering school-based jewellery education should make enough resources available for students to have access to tools and materials so that issues of some lecturers randomly teaching the content of their courses instead of sequential teaching will be minimised if not completely eliminated. Likewise, students should embark on field trips and industrial attachments as the course description stipulates which will help to strengthen the understanding of concepts that are taught and learned in school.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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Appendix 1

Observation Checklist for teaching and learning activities of jewellery at the Metal Product Design Section in the Industrial Art Department, KNUST in Kumasi. This observation checklist is designed to allow the researcher to verify through documents and records to ascertain the information provided verbally by the students and lecturers as well as witness the processes that are involved in teaching and learning jewellery at the MPD section.

Section A: Personnel and infrastructure

- University
- a) The Metal Product Design programme outlines and requirements;
1. Number of courses offered
2. Namely:
- i)
- ii)
- iii)
- iv)
- Brief background of institution
-
- b) Gender of students and enrolment per course;

Table 1. Gender of students and enrolment per course

Class Level	Student enrolment number	
	Female	Male
Year 2		
Year 3		
Year 4		

- iii) Adequacy and suitability of MPD staff and teaching-learning materials.

Table 2. Adequacy and suitability of MPD staff and teaching-learning materials

No.	Adequate	Inadequate	Suitable	Unsuitable
Lecturers				
Technical instructors				
Technicians				
Other supporting staff				
Library				
Jewellery textbooks				
Internet				

e) Adequacy and suitability of teaching-learning infrastructure and facilities (tools, equipment and rooms).

Table 3. Adequacy and suitability of teaching-learning infrastructure and facilities (tools, equipment and rooms)

Infrastructure/Facilities	no	Adequate	Inadequate	Suitable	Unsuitable
Classroom					
Studio					
Melting facilities					
Milling/drawing facilities					
Joining/forming facilities					
Finishing facilities					
Exhibition rooms					
Extra curricula spaces					

Section B: Lessons observation

- The lecturers have good knowledge of subjects and learners. ()
- The lecturer spelt out the instructional objectives to students. ()
- The lecturer established the relation between the present topic and the previous topics that he taught. ()
- The lecturer related the topic to current levels of students' experiences. ()
- Among the strategies used by the lecturer were signalled responses, questioning techniques and guided practises to involve all students in learning. ()
- The lecturer employed a variety of methods to teach the topic. ()
- The lecturer gave directions that are clearly stated and related to the learning objectives. ()
- The lecturer demonstrated the desired skills. ()
- The lecturer checked to determine if students were progressing toward stated objectives by asking students questions and their opinions. ()
- The lecturer changed instruction based on the outcome of students' responses to questions and their participation in the class. ()
- The lecturer ensured that all students partake in the newly taught skills with or without his direct supervision. ()
- The lecturer summarised and fitted the topic he treated into the context of the production of jewellery and metalsmiths. ()
- The student has interest in jewellery. ()
- Students were motivated and encouraged to learn jewellery. ()
- Students were eager to learn how to produce jewellery. ()
- Students create ideas which are relevant to their jewellery works. ()
- Students can interpret and analyse their work. ()
- Students understand the purpose(s) for learning jewellery. ()
- Students show a greater understanding of tools, equipment, materials and how to use them. ()
- Students have developed mastery of making some basic jewellery tools. ()
- Students explored the various jewellery-making tools, equipment and materials to choose which best suits him/her. ()
- Students have attained the knowledge and skills which commensurate with their maturity level. ()
- Students are able to observe objects/subjects intensely through the use of the human senses.
- Students have the knowledge and skills needed to make jewellery. ()

Appendix 2

Interview guide for metal product design lecturers of metal product design, industrial art department, KNUST in Kumasi

The interview guide was designed to solicit the views of lecturers at the Metal Product Design Section of Industrial Art Department-KNUST on how they teach jewellery in their schools.

Please you are hereby assured that the researcher will do his utmost best to keep the information you provide confidentially. The result of this study will be used for scholarly purposes only and may be shared with the academic community.

a) Demographic features of the jewellery lecturers

1. Please may I know your name?
2. What is your gender?
3. Name of institution college..... department..... section.....
4. How long have you been teaching?
5. What is your highest educational certificate?
6. What is your area of specialization?
7. What training system did you go through to become a jeweller?
8. Where were you trained as a jeweller?
9. How long were you trained to become a jeweller?
10. Do you practise as jeweller?
11. How long have you been practising as a jeweller?
12. Which level of students do you teach?
13. How many students are there in the class that you teach?
14. Does the number of students in your class affect teaching practicals?
15. How do you go about it?
16. What is the nature of the course(s) that you teach made of (in terms of practical and theory)?
17. In your estimation, what is the ratio of theory against practical, percentage-wise?

b) Curriculum of the jewellery programme

18. Have you ever read the curriculum of the jewellery course that you teach?
19. Do you think the course description will provide the skills and competencies to make students perform effectively as jewellers after their studies?
20. If not, what are some of the topic(s) will you suggest for providing students with the skills or competencies to perform as jewellers after their studies?
21. In your opinion, does the content follow a systematic sequence?
22. How do you go about teaching the content of the course? Follow the Course Description religiously
Random selection of topics (contents) Follow chapters in a textbook
Select topics according to difficulty and relationship
23. Are you able to complete the content of the course within the stipulated time?
24. If not, what is the average percentage that you usually cover?

c) Teaching facilities and process

25. Do you have adequate infrastructure and machinery for teaching jewellery making?
26. What kind of tools/equipment and machinery do you have at your disposal for teaching jewellery?
27. Are your machinery old or modern types?
28. Please can you state in percentage terms those that are in operation and those that are out of operation?
29. Are there any special tools/equipment/materials for the teaching of jewellery that you lack?

30. Do your students have regular access to materials for doing jewellery practical work?
31. Who provides the materials for practical works?
32. What are some of the book titles that you use to teach the course?
33. How often are practical activities organized for your students in a semester?
34. What are some of the jewellery items you teach your students?
35. How do you go about teaching your students practical jewellery making?
36. How do you organise your practical activities for your students?
37. What are the challenges that are linked with teaching jewellery making?
38. How will you describe the current state of jewellery education in Ghana?
39. Do you see the apprenticeship system of training jewellers as a keen competitor?
40. Any suggestions for improving the teaching/learning of the jewellery?

Appendix 3

Questionnaire for metal product design students at the industrial art department, KNUST in Kumasi

This questionnaire is purposely designed to request for data from students of the above-mentioned school to enable the researcher embark on a study in “A Comparative Analysis of Apprenticeship and School-Based Systems of Jewellery Education in Ghana”.

Please you are hereby assured that the researcher will do his outmost best to keep the information you provide confidentially. The result of this study will be used for scholarly purposes only and may be shared with the academic community.

If you have any question about the research, please indicate it here and you will be responded to accordingly.

A. Demographic features of the students

Name of your school:

1. Class level

• 1st year ()

• 2nd year ()

• 3rd year ()

• 4th year ()

2. What is your gender?

• Male ()

• Female ()

3. How old are you?

• 16-18 years ()

• 19-21 years ()

• 22 years and more ()

4. Which of the following entities introduce jewellery to you when you were choosing your current programme?

• Former teachers encouraged me to enrol on this programme ()

• My friends have chosen to undertake the same programme ()

• My parents suggested me enrol on this programme ()

• My previous examination grades prevented me from being able to enrol on more preferable programmes ()

• The occupation(s) related to the programme appealed to me ()

• The programme offered good job prospects ()

• The programme provided a good foundation for further education ()

• The reputation of the programme was attractive to me ()

• This programme was the most appropriate within a reasonable distance from my home ()

B. Jewellery curriculum

5. Have you had the opportunity of reading the jewellery syllabus/curriculum of Metal Product Design?

• Yes ()

• No ()

6. If yes, what are some of the topics in the syllabus/curriculum that give you hope of becoming an effective jeweller after the course?

.....
.....

7. If no, list some of the topics that you required in order to become an effective jeweller after the course.

.....
.....

8. Do you have textbooks for your private studies?

- Yes ()
- No ()

9. If yes, mention the titles of any two of such books.

.....

.....

.....

10. What is the first practical jewellery item(s) did you do?

.....

.....

.....

11. How often do you have jewellery-related practical exercises in a term/semester?

- 0-2 ()
- 3-5 ()
- 6-10 ()

12. Do you actively participate in practical exercises?

- Yes ()
- No ()

13. If no, state the reason(s) why you do not actively participate in practical exercises

.....

.....

.....

14. Do you have enough materials for practical works?

- Yes ()
- No ()

15. If yes, who provides them?

- School administration ()
- Teacher ()
- Philanthropists ()

16. If not, how do you get materials to do your practical work?

17. Does the school have a permanent studio for practical exercises?

- Yes ()
- No ()

18. If not, where do you undertake your practical work?

- Classroom ()
- Out of campus ()
- Under shed ()

19. When does the class usually have practical exercises?

- Morning ()
- Afternoon ()
- Evening ()
- No specific time ()

20. Do you have enough time for your practical work?

- Yes ()
- No ()

21. Which of the following equipment is/are available in your school?

- Work station ()
- Furnace ()
- Rolling mill and drawplate ()
- Basic jewellery making hand tools ()
- others ()

22. If others, please list them:

.....

.....

.....

.....

23. What are the main challenges/difficulties that you face as a jewellery student (in terms of course content, facilities, teaching and others?)

.....

.....

.....

.....

24. Have you been on jewellery training attachment?

- Yes ()
- No ()

25. How many of such attachments have you done so far?

- 1 ()
- 2 ()
- 3 ()
- 4 ()
- 5 ()
- 6 and above ()

26. Have you been adequately exposed to what the jewellery programme is all about?

- Yes ()
- No ()

27. If yes, to what extent do you agree with the following statements?

- Enables me to receive a good starting salary/wage when successfully completed ()
- Ensures employment in the job market ()
- Is recognised within society as having a good reputation ()
- Offers me a broad perspective for a professional career ()
- Prepares me for a job that is important for society ()
- Prepares me for starting my own business or becoming self-employed ()
- Prepares me well for further education and training ()
- Provides useful practical experience for entering the workforce ()

28. Looking back, if you were to choose again would you choose the same programme?

- Definitely not
- Rather not
- Maybe
- Most likely
- Definitely

29. Make a suggestion that will help improve the learning of jewellery in the SHS/tertiary.

.....

.....

.....

.....

30. If you have any questions about the research, please indicate them here and you will be responded to accordingly.

31. How do you rate the performance of your teacher as far teaching of jewellery subject/course is concerned?

- Excellent ()
- Very good ()
- Good ()
- Poor ()
- Very poor ()