Research Article

Bookbinding and photographic screen printing: A factor to mitigate unemployment among graphic design graduates in Ghana

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Abstract

Keywords

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The primary focus of this study was to look at how bookbinding and photographic screen printing, courses within the Graphic Design programme at both Traditional and Technical Universities in Ghana with specific emphasis on Takoradi Technical University, could be used to mitigate graduate unemployment menace in the country. The objectives of this study were to identify types of hand bookbinding, hand photographic screen printing, tools, equipment and materials used and using both as a means to mitigate unemployment among Graphic Design graduates. The research design employed was qualitative research approach since the nature of this study required comprehensively dependence on observation, document reviews, content analysis and verbal data from appropriate stakeholders, well-versed in hand bookbinding and photographic screen printing in order to draw all-inclusive conclusion. Findings revealed that with appropriate training and set-up funding capital, Graphic Design students from Takoradi Technical University will be able to set-up their own businesses after graduation. The study recommended that sufficient teaching and learning resources including state-of-the art studios and laboratories and start-up funding capital should be provided to the Technical Universities and graduated graphic design students by the government to help set-up their own businesses after graduation. Additionally, the government should have in place a reliable data on graduate unemployment so as to inform policy and create enabling atmosphere for graduates intended to set-up their private businesses after graduation in order to contribute their quota to the socio-economic development of Ghana.

Introduction

There has been in recent years some employment interventions programmes such as the Youth Employment Agency (YEA), National Youth Authority (NYA), National Builders Corps (NABCO), Planting for Food and Jobs, and Rearing for Food and Jobs, and the National Entrepreneurship and Innovation Programme (NEIP) by the government of Ghana, in attempt to address unemployment challenges confronting tertiary student graduates (both traditional and technical universities) in the country (Kwofi. 2021). Still, challenges associated with unemployment, a growing canker that has reared and keep on rearing its ugly head among all tertiary student graduates, has become an albatross hanging around the neck of successive governments. It was due to these challenges that led to the formation of the *'Unemployment Graduates Association of Ghana (UGAG)'* in 2011 to ensure the well-being of all tertiary student graduates (Opera News, 2022).

At MasterCard Foundation Annual Learning Summit under the theme: *'Preparing Students for Employment and Entrepreneurship: What Works?* in 2017, it was revealed through a data by the Institute of Statistics, Social and Economic Research (ISSER) of the University of Ghana that only 10% of graduates find jobs after their year of completing school. The data also indicated that it may take up to 10 years for a large number of graduates to secure employment due to varied challenges that ranged from lack of employable skills, unavailability of funding capital for entrepreneurship, poor attitudes of graduates towards job opportunities, as well as the capacities of industry to absorb the large numbers (GNA (Citifm Online), 2017).

In the same vein, the World Bank estimates that more than 110,000 of youth graduates from the universities every year, but low economic output, especially in the non-oil and mineral extractive sectors mean that more than 12% of the youth are unemployed and more than four times that number are underemployed (Kwofi, 2021). To

this, Ghana Employers Association (GEA) maintained that the employment challenges as indicated by ISSER and the World Bank will continue to intensify looking at the number of tertiary students graduating every year if job opportunities remain limited in the country. To address these unemployment challenges, a research officer of GEA, Kingsley Laar outlined a strategic point that the government should take keen steps that could help create a conducive environment for businesses to thrive since employment creation often depends on the existence of an enabling environment for the private sector to thrive, expand and engage more people (Kwofi, 2021).

These unemployment challenge needs to be looked at and addressed because of its dire implications in relation to security, stability and socio-economic development of the country. Based on this, to tackle the graduates' unemployment challenge, hand bookbinding and photographic screen printing, a practical-based courses in the Graphic Design programme that train and equip students with hands-on skills, competences and entrepreneurial skills should be looked at as a major factor in mitigating unemployment among graphic design graduates from Takoradi Technical University.

Discussions

Per the core mandate of the Technical Universities, as enshrined in Act 2016 (Act 922), the Technical Universities are mandated to train and equip students with hands-on skills, competences and managerial skills in each of the programmes they pursued. The underlining factor in these training of the students hinges on the need of the job market or establishing their own businesses after graduation to employ others and contribute their quota to the socio-economic development of Ghana. There are six departments, namely Department of Graphic Design Technology, Department of Textiles Design and Technology, Department of Sculpture and Industrial Crafts, Department of Ceramics Technology, Department of Industrial Painting

and Design and Department of Fashion Technology and Design at the Faculty of Applied Arts and Technology (FAAT), one of the six faculties in TTU. At the Department of Graphic Design Technology, Graphic Design programmes ranging from the Higher National Diploma (HND)in Commercial Arts (Graphic Design Option), Bachelor of Technology (B-Tech) Top-Up, B-Tech 4-Year, Master of Technology (M-Tech) in Graphic Design and M-Tech in Printing are pursued with embedded bookbinding and printing technology courses. All these Graphic Design programmes have the required accreditations from then National Accreditation Board (NAB) now Ghana Tertiary Education Commission (GTEC) is needed for the running of tertiary programmes in Ghana (TTU Diary, 2020;Graphic Design Curricula).

As a matter of fact, Takoradi Polytechnic now Takoradi Technical University (TTU) was established in April 1954 as a Government Technical Institute and operated for thirty-nine (39) years under the Ghana Education Service (GES) of the Ministry of Education (MOE). During that period, it offered programmes mainly at the Craft and Technician Certificate levels in commercial and technical subjects awarding Royal Society of Arts (RSA) and City and Guilds of London, United Kingdom Certificates, however in 1990, the GES took over the awards of both the RSA and City and Guilds of London certificates (TTU 2020 Diary). As part of the Ghana Educational Reforms which began in the 1980s, according to TTU Diary, 2020, institution in addition to other five (5) similar institutions were upgraded by the Polytechnic Act 321, Provisional National Defence Council (PNDC) Law 1993 to become part of the Ghana Tertiary Education System. The Polytechnics, per the law, began to offer Higher National Diploma (HND) in Commercial Art (Graphic Design Option) programmes in the 1993/1994 academic year. These reforms mandated the Polytechnics of which Takoradi Polytechnic was one to compliment the role of the Traditional Universities to increase access to tertiary education for the training of middle and higher-level manpower.

Then in the year 2016, an Act of Parliament, namely the Technical University Act 2016 (Act 922) subsequently converted eight of the ten Polytechnics in Ghana out of which Takoradi Polytechnic met the requirements and was converted and renamed Takoradi Technical University (TTU Diary, 2020). The main aim and objective of running these Graphic Design programmes at the Department of Graphic Design Technology at TTU are typically industry-driven in nature, based on this, it requires the students to be taught skills in creative thinking and their application in Graphic Arts industry (Dennis & Jenkins, 1991). In addition, the students are required to be trained and equipped with hands-on skills, competences and managerial skills needed and requirement for employment or set-up their own businesses after graduation. According to Dennis & Jenkins (1991); Alismal & McGuire (2015); Herrera (2012) these training and equipping of the Graphic Design students with those practical, industry-driven courses help them to stand on their own without chasing non-existence jobs, but rather start their Graphic Arts businesses after graduation through the acquisition of the much-needed skills, knowledge and deposition necessary to become valuable to the growth of Ghana.

It is worth noting that Graphic Design graduates from the Department of Graphic Design Technology, TTU were chosen for the study because among all the Technical Universities in Ghana it is only TTU that started running HND in Commercial Art(Graphic Design Option) first in 1993/1994 Academic Year when the University was then known as Takoradi Polytechnic. Currently, TTU runs B-Tech Top-Up programme for HND graduates who wants to further their education, 4-Year B-Tech programme and it is the only Technical University that runs two (2) M-Tech programmes in both Graphic Design and Printing accredited by Ghana Tertiary Education Commission (GTEC) – the body solely mandated to give accreditation to institutions both public and private to run tertiary programmes. Additionally, all the Graphic Design programmes, i.e., HND in Commercial Arts (Graphic Design Option), B-Tech Top-Up, 4-Year B-Tech,

M-Tech in Printing and M-Tech in Graphic Design, have bookbinding and screen printing embedded in the various courses students pursue. With these in mind, the study will now be delineated to the aim of the study, i.e., hand bookbinding and hand photographic screen printing: a factor to mitigate unemployment among Graphic Design graduates in Ghana.

1. Hand Bookbinding

Bookbinding is an artistic craft of great antiquity, but today, modern bookbinding is divided between *'hand binding'* by individual craftsmen working in a *'one-room'* studio shop and *'commercial binding'*, mass produced by high-speed machines in a production line factory. The purpose for binding a book is primarily to preserve them intact. Unless the sections were held together and bound between covers, they would soon be separated from one another and texts would rarely survive in their entirely. This indicates that the primary function of binding is to hold books together and protect them from tear and wear (Diehl, 1980). In support of this, the World Bank Encyclopaedia (1992) indicates simply that bookbinding is the process of putting the paper of a book between covers.

It must be stated here that printing, without doubt, served to stimulate the craft of binding. The binding of books extended beyond the monasteries as books were produced in greater numbers, and from the first part of the fifteen century, bookbinding began to be developed into a regular craft and trade, keeping pace with the printing press. The underlining point here is that, following the invention of the printing press by Johannes Gutenberg in 1438, bookbinding became a specialty. As books increased in number, the printer devoted himself to his trade only and binding of books became an important occupation (Diehl, 1980).

Types of Hand Bookbinding and Tools, Equipment and Materials Used

Types of binding are so many that a bookbinder does not need to put restriction on how to do what, except when he/she considers the use of particular book at hand, although according to Lee (1979) there are three (3) basic kinds of book binding and these are:*(i) case, hard binding or hard cover, (ii) paper, paperback or soft cover* and *(iii) mechanical, including 'spiral' binding, etc.* In spite of these 3 binding methods stated by Lee, this study will look at the following four (4) types of binding which Graphic Design graduates can practice and employed themselves after graduation, although there are other types of binding available and these are *saddle-wire stitching, perfect binding, multi-section binding* and *comb binding.* Examples of these hand bookbinding types are:

1. Saddle-wire Stitching Method

Saddle-wire stitching method, also known as saddle stitching or side stitching is a method of binding where pages or sections including the cover are folded, stapled together with a stapler loaded with staple pins which has longer jaws and designed specifically for this method of binding and then trimmed to the required size before use. A typical example of this method of binding is the *exercise books* used in schools in Ghana.

Figure 1: Saddle-wire Stitched Books showing the Staple Pins at the Edges
(Source: Fieldwork, 2021)

Tools, Equipment and Materials used for Hand Saddle-wire Stitching Production

Knives, pencil, safety rule, staple pins, workbench, stool, cutting boards, stapler, newsprint, bond paper, newsprint and cover paper such as Manilla card.

2. Perfect Binding

This is also known as adhesive or unsewn binding method. It is another method of binding books without the use of stitches and it works exclusively with loose sheets of paper which are held together by means of a flexible adhesive or glue, i.e., the adhesive binds the single sheets of paper, but not in sections or signatures. Examples of perfect bound books are jotters, pads and casual reading types of books.
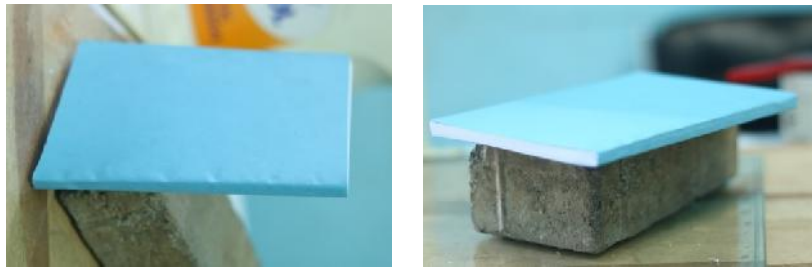
Figure 2: Perfect bound Books
(Source: Fieldwork, 2021)

Tools, Equipment and Materials used for Hand Perfect Binding Production

Tools: Knives, pencil, safety rule and brush
Equipment: A workbench, stool and cutting boards
Material: Newsprint, bond paper, covers paper/boards and adhesive/glue

3. Multi-section Binding

This is so called due to the nature of the covers. The covers are made of hard boards covered either cloth, leather, their imitation or paper and their preparation is called a *'case.'* There are two (2) main branches of hand multi-section binding, one is known as *'forwarding'* and the other as *'finishing'* (Diehl, 1980). Examples are textbooks and bound thesis or project works.

Figure 3: Multi-section bound Books
(Source: Fieldwork, 2021)

Tools, Equipment and Materials used for Multi-Section Binding Production

Needles, knives, brushes, safety rule, bodkin, pencil, scissors bone folder, workbench, chair or stool, standing press or backing press, cutting board, nipping press, newsprint, bond papers, binding tapes, headbands, mull/muslin or gauze, Kraft or brown paper, binding cloth, paper board, adhesive (glue), thread and endpapers.

It must be noted here that there are four (4) types of multi-section bound books and these are:

i. Full Binding: Is when a multi-section book is bound or covered entirely from one piece of cover materials.
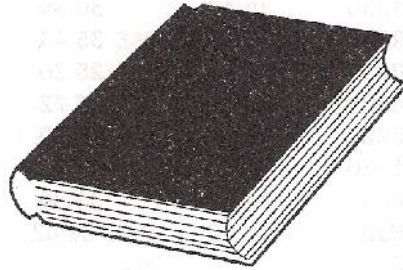
Figure 4: Full multi-section bound Book
(Source: Fieldwork, 2021)

ii. Half Binding: Is when a multi-section book has the cloth on the spine and the corners taking¼ of the surface area of the corners.
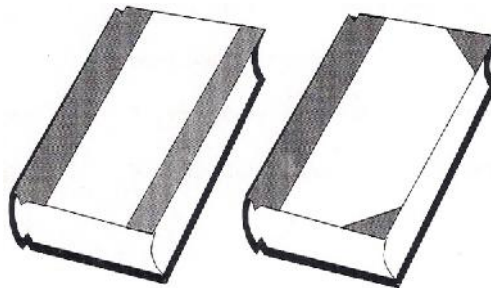

Figure 5: Half multi-section bound Books
(Source: Fieldwork, 2021)

iii. Quarter Binding: Is when a multi-section book has cloth only at the spine and it takes ¼ area of both sides of the book.
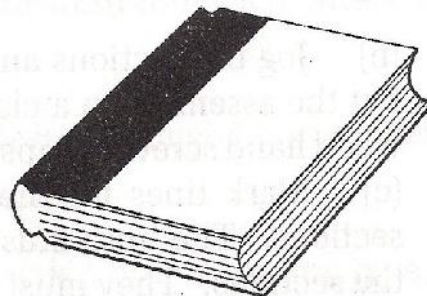

Figure 6: Quarter multi-section bound Book
(Source: Fieldwork, 2021)

Three-quarter Binding: Is when a multi-section book has cloth on the spine and the corners, and these take   of the width of the covered surface of each side.
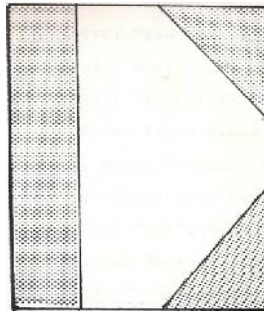
Figure 7: Three-quarter multi-section bound Book
(Source: Fieldwork, 2021)

4. Hand Comb Binding

Hand comb binding, also known as plastic comb binding is a method where a plastic comb is fed or inserted through the edges of pre-holed or tiny punched holes in the sheets of paper with the help of punching machine with an attached comb opener. Examples of comb binding books are printed documents or business reports which need regular updates, school assignments and presentations.
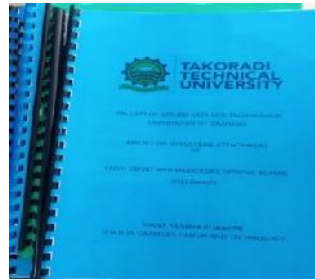
Figure 8: Comb bound Books
(Source: Fieldwork, 2021)

Tools, Equipment and Materials used for Hand Comb Binding Production

Knives, pencil, safety rule, workbench, stool, cutting board, punching machine with an attached comb opener, cartridge paper, vanguard paper, transparencies/plastic sheet of papers and plastic combs or teeth

Examples of Tools, Equipment and Materials used for Hand Bookbinding Production

Figure 9: A Pair of Scissors and Safety-Metal Rule
(Source: Fieldwork, 2021)

Figure 10: Brushes and Needles
(Source: Fieldwork, 2021)

Figure 11: Bodkin and Bone Folder
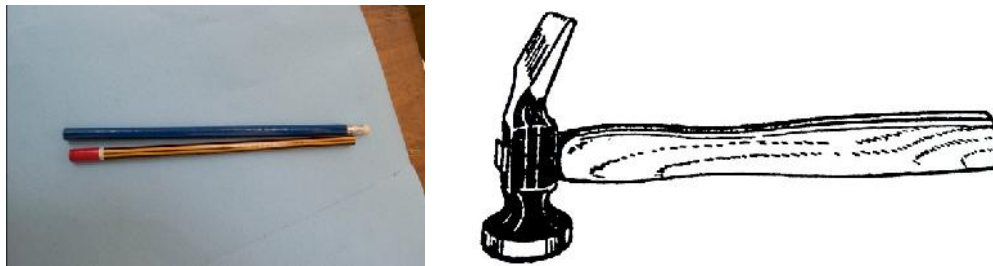(Source: Fieldwork, 2021)

Figure 12: Pencils and Backing Hammer
(Source: Fieldwork, 2021)

Figure 13: Card Cutter and K115 CE Guillotine with a Monitor
(Source: Fieldwork and Saint Francis Press, Takoradi. Ghana)

Figure 14: Cutting Board and Standing Press
(Source: Fieldwork, 2021)

2. Hand Photographic Screen Printing

Screen printing, also known as silk screen printing, stencil printing, mitography or screen process printing is an artistic craft that can be traced to ancient times and as late as 1953, it was described as the least industrialized of all Graphic Arts, but today it is a mechanized industry, having moved from a low output hand operation to a process having considerable mechanization (Dennis & Jenkins, 1991). In addition, modern screen printing is also divided between *'hand screen printing'* by individual screen-printing craftsmen working in a *'one-room'* studio shop and *'commercial screen printing'*, mass produced by high-speed machines in a production line factory.

Screen printing is, in a way, another form of planographic printing process based on the use of gauze like material such as silk, nylon, etc., stretched over a wooden or metal frame on which there is a fixed stencilled image produced either by hand or photomechanical means (Amissah & Gyimah, 2015). In support of this, Campbell, (2005) and Dennis & Jenkins (1991) posit that screen printing as a printing process whereby ink is forced through a fine mesh stretched across a frame. The image is formed by means of a hand-cut or photographically generated stencil, which is bonded to the screen. Simply put, the basic concept of screen printing is based on the idea of a stencil.

It might sound strange to many people, even to some whom claimed to be veterans in the printing industry, when the term *'printing press'* is associated with the most basic screen-printing frame with a stretched fabric containing the designs and texts (known as stencil) to be printed, but in practical sense, it is a normal *'printing press.'* This is because the following five (5) development that occurs same as in a normal printing press: (i) substrate to be printed on must be fed (i.e., feeding), (ii) registered under the stencil (i.e., registration) and then (iii) the ink being used must be transferred with the help of squeegee onto to the substrate (i.e., printing), (iv) after the printing, the printed product must be removed, either dried or for drying (i.e., out-feeding) and finally, (v) the printed product must be removed and stored for later distribution (i.e., storage).

Types of Screen Printing and Tools, Equipment and Materials Used

To Dennis& Jenkins (1991) there are three (3) basic kinds of screen-printing image carriers, namely (i) knife-cut film, (ii) photographic, and (iii) washout (tusche), but to Broekhuizen (1973) and Karsnitz (1993) there are four (4) types of screen process printing and these are: (i) paper stencil, (ii) tusche (and glue) stencil method, (iii) hand-cut film method, and (iv) photographic screen method. Based on the objective, this study would now be focused principally, on the *photographic screen printing*, the method that has propelled the screen, a simple stencil printing method probably practiced more than thirteenth centuries ago into a position of significance in the Graphic Arts industry (Dennis & Jenkins, 1991). And also, as basis for beginners in the industry.

Hand Photographic Screen Printing

This is also known as photographic stencil printing. The primary reason for the growth of the screen-printing industry today can be assigned basically to the development of the photographic screen method, which uses the same principles as the other photo-mechanical processes that makes it possible for light-sensitive emulsions harden when exposed to intense light – be it natural or artificial. Hence, it is not a surprising phenomenon that it (photographic screen method) has become the most commonly used stencil technique in the screen printing or Graphic Arts industry. This type of screen-printing method is prepared from a film positive and excludes all handwork except for drawing of the original copy, and is grouped as direct or indirect photographic screen methods (Dennis & Jenkins, 1991; Karsnitz, 1993).

There are three (3) types images inherent in photographic screen processes, and these are: (i) direct image method (or photographic direct method or direct photo-screen); this method uses a wet emulsion that is coated directly on a clean screen with an attached a fabric/mesh, (ii) indirect image method (or photographic indirect method or indirect photo-screen); this method uses a dry emulsion on a plastic support or backing sheet, and (iii) direct/indirect image method; this method combines the techniques of both the direct and the direct photographic processes (Karsnitz,

1993). Logically, because most photographic stencil emulsions have a spectral sensitive that peaks in the *ultra-violet (UV)-to-blue region* of the visible spectrum and the stencil emulsion must be exposed through a transparent positive. A good contact is important to ensure accurate line detail, based on these vacuum frames (exposure equipment) are generally used to hold the stencil and film in place during exposure.One fact that should always ring a bell in the ears of a screen printer is that proper exposure is important for photographic screen stencils. This is because: (i) *an under-exposed stencil* will produce an emulsion that is too thin and a thin emulsion will have difficult adhering to the screen material, with the possibility of passing ink in a non-image area, and(ii) *an over-exposedstencil* will result in an emulsion that is too thick; a thick emulsion will close in the fine line detail and, if on an indirect stencil, might not adhere properly to the fabric.

Tools, Equipment and Materials used for Hand Photographic Screen Production

Screen printing frame (wooden or metal), screen fabric/mesh (white or yellow), squeegee, screen printing inks, artwork/copy, stapler, staple pins, utility knife, pair of scissors, coating trough, timer, drying tools, dry sensitizer powder/potassium dichromate, liquid un-sensitized/diazo-based emulsion and padded workbench. Some pictorial examples are:

Figure 15: Wooden Screen Frame and White Screen Fabric/Mesh
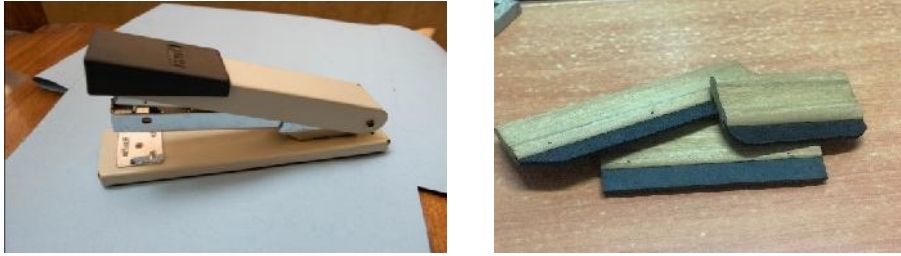(Source: Fieldwork, 2021)

Figure 16: Stapler/Staple Gun and Squeegees
(Source: Fieldwork, 2021)

Figure 17: Screen Printing and Plastisol Inks
(Source: Fieldwork, 2021)

Figure 18: Utility Knives and Wooden Frame Exposure Equipment
(Source: Fieldwork, 2021)

Figure 19: Plain and Hand Photographic Screen Printed T-Shirt
(Source: Fieldwork, 2021)

Using Bookbinding and Photographic Screen Printing as a Means to Mitigate

Unemployment among Graphic Design Graduates

The underlying objectives/purposes of both hand bookbinding and photographic screen-printing courses in the Graphic Design programme at TTU are situated in craftsmanship. Craftsmanship is not an academic subject, and no craft can be mastered by learning about it from a book. It is empirical knowledge that counts in producing a skillful craftsman since it is a practical matter. Long hours of work at the workbench are necessary, repeating operation after operation before the eye can be trained, the hand, made skillful and the mind eye and hand coordinated to produce hand bound books and photographic screen-printing product skillfully and aesthetically (Diehl, 1980).

The assertion is that a would-be Graphic Design student who wants to set-up his/her own hand bookbinding and photographic screen-printing business must be able to take his/her studies including industrial attachment seriously and get his/her real knowledge from workbench practice. It must be stated here that there is no dispute about the fact that machines work faster with much precision than the hand, but the fact that people go for hand-made products, such as bookbinding and photographic screen-printing products, establish the point that machines can never excel than the hand that manufactured them, especially with works that demand craftsmanship.

It is therefore important to empower Graphic Design students in tertiary institutions on hand bookbinding and photographic screen printing, a course embedded in the Graphic Design programme by providing the knowledge, hands-on skills, competences and attitudes to achieve success in a variety of hand bookbinding and photographic screen-printing settings. As this will help to position them with the needed attributes to

set-up their own businesses after graduation instead of chasing non-existent employment or be part of the *Unemployment Graduates Association of Ghana.*

Hand bookbinding and *photographic screen printing,* courses embedded the Graphic Design programme run at the Department of Graphic Design Technology, TTU are typical vocational skill courses earmarked to equip students with the requisite hands-on skills, competences and entrepreneurial skill for employment or setting up their own businesses after graduation and does not require much financial to be able to acquire tools and set-up a workshop.

If the would-be binder or screen printer is innovative, he/she can convert or improvise many ordinary implements into hand bookbinding and screen-printing tools, equipment and materials to use in his/her established workshop for bookbinding and screen-printing activities. In support of this assertion on hand bookbinding tools, equipment and materials, Darley (1959) stated that the equipment required in the binder's shop for this various style was simple and unchanged since ancient times; a needle and thread for sewing; hammer and wedge-shaped boards for shaping the shoulders and spines of the book; a cutting device called plough by means of which a knife smoothly ploughs its way across the edges of a book. Most of the tools for leatherwork can also be used by the bookbinder

Table one (1) below shows some examples of implements that can be improvised into hand bookbinding tools and equipment by the binder to use in his/her workshop for production:

Table 1: Tools and equipment that can be Improvised for Hand Bookbinding Production

No	Hand Bookbinding Tools	Improvised Tools and Equipment for Hand Bookbinding Production
1	*Cutting/utility knives* – used for cutting and trimming	A cutting knife can be made from an old or used hacksaw blade
2	*Straightedge* – used to obtain straight cuts and for ruling	Straightedge can be constructed or made by a local carpenter for production
3	*Brush* – for any gluing and pasting work	A brush can be made with a cut-sized wood and a well-beaten coconut fibre measuring about two and half centimetres thick and tied tightly at the base of the handle with a cord or ringed with a scrap metal
4	*Bodkin or awl* – used for making holes when sewing	A nail or nail-like metal piece can be sharpened and given a handle, and used as bodkin or awl. Also, an old screw-driver makes a good bodkin
5	*Bone folder* – used for specific folding, greasing and smoothing operations	Bamboo, the handle of a toothbrush and a comb can be re-shaped into bone folders for folding papers for binding
6	*Tenon saw* – used for cutting recessions in the spine of books in sewing and gluing	An old hacksaw blade can be used as a tenon saw
7	*Standing press* – used for holding books flat while they are drying	Concrete (cement made) blocks on top of two pressing boards between which the books are held makes a popular improvisation in Ghana
8	*Workbench and Stools* – usedforpunching, hammering, cutting, pressing, forwarding and finishing processes	Workbench and stools (preferable than chairs) can be constructed by a local carpenter for production
9	*Cutting board* – used to facilitate an ease cutting of the edges of a book	Cutting board can be made by a local carpenter for same production

Other hand bookbinding tools and equipment can be purchased to augment the ones stated above to facilitate bookbinding production or solicit services by other graphic arts industries for a fee by graphic design graduates who has set-up his/her own business. For instance, trimming of book blocks earmarked for binding with a guillotine machine, printing of the writing lines as in the case of school exercise books (popularly known in Ghana as Note One (1) Exercise Book) and the designs on the back covers, On the issue of others, such as strawboard, kraft/brown paper, binding cloth, chromokote, bond paper, newsprint mull/muslin, vanguard, needle, thread, stapler, staple pins, adhesive/glue, etc., can also be purchased at stationery stores locally and the would-be hand bookbinder will be in business/production.

Table two (2) below shows some examples of implements that can be improvised for hand photographic screen printing tools and equipment by the screen printer to use in his/her workshop for production:

Table 2: Tools and equipment that can be used for Hand Photographic Screen Production Production

No	Hand Photographic Screen Printing Tools	Improvised Tools and Equipment for Hand Photographic Screen Printing Production
1	*Screen printing frame* (wooden or metal) – used as a framework that the fabric/mesh is mounted on	A wooden screen printing frame can be constructed by a local carpenter for production. In Ghana, wooden screen printing frames are made of 'wawa' wood because it is inexpensive, fairly staple and sassily cut to any dimension
2	*Screen fabric/mesh* – the material that the graphic art image/design is transferred onto and subsequently for printing	Ghanaian screen printers prefer white mesh other than yellow mesh because it is less expensive in the market, exposes faster and produces sharper images compare with yellow mesh. Also, second-hand organdy, polyester and nylon fabrics in the market are used as screen fabric/mesh in Ghana
3	*Squeegee* – used to force the ink across the stencil, causing the ink to go through the image carrier's openings at the point of contact	A medium hardened grade and square-edged squeegee, which is for general usage, can be construct by a local carpenter for production
4	*Drying equipment* – used to facilitate drying after printing	Basic, inexpensive clothes hanger can be purchased in the market and used to facilitate drying of printed T-shirts
5	Padded workbench – provides a flat surface for positioning of the substrate for printing	Padded workbench can be constructed by a local carpenter for production.

Other hand photographic screen-printing tools, equipment and materials can be purchased to augment the ones stated above to facilitate screen printing production or solicit services by other Graphic Arts industries for a fee by Graphic Design graduates who has set-up their own businesses. For instance, screen printing inks, photo-emulsion, sensitizer, coating trough, stapler, staple pins, masking tape, adhesive/glue, brushes, T-shirts etc., can also be purchased at stores locally and a would-be screen printer will be in business/production.

Conclusions

The discussion so far on the soaring unemployment rate among graduates has revealed that the ministry of education in conjunction with the government of Ghana has not been resourceful or innovative enough to look beyond the traditional way of creating employment for students graduating each year from the Ghanaian universities.

This traditional way of employing graduates and the interventions implemented through such agencies like YEA, NYA, NABCO and NEIP have, debatably, failed, thus the unemployment rate continues to increase observing the number of tertiary students graduating every year because employment opportunities continue to be limited in Ghana. Secondly, a favourable environment for private businesses to grown through accessing less-interest bank loans for expansion in order toemploy more of the graduating students are non-existence.

Thirdly, start-ups in terms of interest free or lower financial capitals in the form of government guaranteed loans or deliberate effort on the government's part to give out tools, equipment and materials to fresh graduates to start their businesses after graduation are holistically lacking. Finally, achievable effort by the government to guarantee a smooth changeover and helpful programmes for employment for all graduates existing from Ghanaian universities are practically non-existence.

Based on the fact that the Technical Universities in Ghana, with much emphasis on TTU, where two (2) courses, i.e., hand bookbinding and photographic screen printing, embedded in the Graphic Design programme run at the Department of Graphic Design Technology and have the potential to address the unemployment among the Graphic Design graduates have not been looked at critically. This makes the authors of this study conclude that the government in its quest to address the unemployment rate among graduates lack a sense of direction and approach in mitigating the challenge. This is because the two courses train and equip students with knowledge, hands-on skills, competences and entrepreneurial skills, a practical requirement acquired and needed by each graduating graphic design students with the intent for them to set-up their businesses after graduation, and contribute their quota to the socio-economic development of the country.

Recommendations

Based on the discussions and conclusions of the study, the following recommendations have been made for consideration towards addressing the graduate unemployment challenges in Ghana:

1. The government of Ghana through the ministry of education must provide more of the state-of-the art studios, laboratories and workshops well stuffed with modern tools, equipment and materials to improve the teaching and learning of hand bookbinding and photographic screen printing in the technical universities that run Graphic Design programmes.

2. The government must create unlimited employment opportunities for Graphic Design graduates to use as stepping stones to help them set-up their own businesses after graduation instead of chasing non-existence white collar jobs.

3. The government must create favourable environment for private Graphic Arts industries by lowering the current high loan interest and duty free on certain categories of tools, equipment and materials imported in order for them to expand and employ more of the graduating graphic design students.

4. The government must as a policy deliberately give set-up financial support in terms of free or the barest minimum interest loans and tools, equipment and materials to the graduating Graphic Design students to afford them the opportunities to set-up their own businesses after graduation.

5. The government must walk the talk by setting a vibrant body charged to see to the smooth changeover from the classroom to employment space for all the Graphic Design students exiting from the technical universities in Ghana.

6. Graphic Design teachers at the Technical Universities must have adequate time to integrate theory and practice in hand bookbinding and photographic screen printing for effective teaching and learning of the courses, and in addition impact the needed hands-on skills, competences and entrepreneurial skills to the Graphic Design students.

7. The Technical Universities in conjunction with the ministry of education must at shorter intervals organise in-service training programmes and industrial attachments during vacations for teachers of hand bookbinding and photographic screen printing and its related activities so as to improve the delivery of the teachers.

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