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TOWARDS BEST PRACTICES IN METAL CASTING: INTEGRATING THE INDIGENOUS APPRENTICESHIP SYSTEM OF 'IGUN STREET' IN THE UNIVERSITY OF BENIN ART SCHOOL

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Abstract
"Igun Street" in Benin City is synonymous with metal casting which dates back to the old Benin kingdom. Overtime, numerous brass castings have been churned out of there, not only for local appreciation but internationally, too. Significantly, this has contributed to the prominence of Benin Kingdom on the world map. Even though "Igun Street" may not be aptly described as a typical formal art school, brass castings made there have been described in some quarters as technically proficient. This brings to bear, the essence of effective ways of achieving desired results in creative tasks. Metal casting also called Foundry Practice is a very important component of the Fine and Applied art curriculum of University of Benin Art School. Over the years, students specialising in Metal Design and Sculpture from the University of Benin have had reasons to go to Igun street to privately complete their metal casting exercises. The reason for this interface may not be farfetched. Essentially, in this article, while appraising the metal casting of University of Benin Fine Art Department, the need to integrate the indigenous apprenticeship system of acquiring skills as is typical of Igun street is articulated. Against this background, it becomes imperative to examine the casting style of 'Igun Street' brass casting guild and the benefits it holds for the University of Benin art school students. It is however hoped that such integration will afford the students opportunities to perfect their skills. Also, broaden the scope of metal casting curriculum content in the art school indeed a synergy of this nature may also translate to best practices in foundry practice.

Keywords: Metal casting, Metal design, Best practices, Apprenticeship system.

Introduction

Metal casting is a term that refers to a production process by which molten metal is poured into a mould that contains a hollow cavity of a desired shape. Gold, copper, aluminum, brass, bronze etc are some metals commonly used in metal casting. Specifically, casting as a production process is used in the production of artefacts. Traditionally, metal casting is an important constituent of the sculpture curriculum of art schools. The University of Benin art school is one of such art schools where casting forms part of the curriculum. Generally, the aim of the Department of fine and applied art, University of Benin is to cater for the diverse academic and creative interests of students, while providing them opportunities for effective practice upon graduation. No doubt such an enterprise will go a long way to boost manpower development for the Nation, and for the individual's self-sustenance. It is also important too that outcomes from such processes should come with finesse, emanating from robust demonstration. Indeed, the practice of metal casting may be synonymous with artistic expressions but not quite limited to it. Essentially, casting as a process allows for the production and mass-production of a single or multiple forms. It is also for this reason that engineers oftentimes resort to casting for the production of engine parts, especially where precision is required.

In Nigeria, Ife, Benin City and Igbo Ukwu are some towns with known traditions of bronze and brass casting. In this context the term 'Benin arts', as used in more recent times refer to a collection of artistic expressions produced in Benin City. Specifically, bronze castings produced in Igun street (a street in Benin City) forms a chunk of this collection. The bronze casting 'industry' in Benin City is still very much alive in Igun street till date. In the observation of Nevadomsky (2005), several dozens of brass-casting families live in Igun street. He also noted that residence brass casting has a long tradition especially in its historical background as a peoples' occupation. The Igun brass casting tradition has not only made its mark in the past, but in contemporary times yet expanding. This present status of Igun brass casting industry may not be unconnected with the fact that these casters have come to be recognised for their craftsmanship. This has attracted patronage from all parts of the World, and may have also motivated the casters to align to global trends. No wonder Nevadomsky (2005) in his assessment of brass casting in Nigeria declared that brass casting flourishes most in Igun street. Evidently there may be slight modifications in the styles and themes of Igun street castings but the production methodology remains basically the same. No doubt this methodology of casting has been so sustained having been passed on from one generation of casters to another, through the indigenous apprenticeship system.

The crux therefore in this article is to firstly appraise the informal Igun street training system, which is basically one of apprenticeship. Thereafter, ascertain the possibilities of an integration of the Igun street approach with the formal metal casting curriculum of the University of Benin art school. The expectation is that a collaboration of this nature may expand the opportunities for best practices in the outcomes of students in the field of metal casting technology. On the part of the Igun street craftsmen's guild, such a relationship may articulate the need to recognise the skills they offer. This may be a platform to strengthen social partnership and dialogue between both Institutions.

Igun Metal Casting Technology

In pre-colonial Benin, there are evidences suggesting a highly organised Kingdom. For instance, there was the guild system with each guild performing specific duties. The "Igun-Eronmwon" otherwise known as the Igun street guild of bronze casters is the case in this paper. Igun street is somewhat located in the heart of Benin City a few meters away from the present location of the National Museum. It is also significantly bounded by the Oba's palace from where it tends originally, to draw most of its themes. It is important to note too that it was familiar place in the past for most of the traditional guilds to reside around the palace (fig. 1a). This may not be far from the fact that these guilds were mostly meant to serve the needs of the Oba, his palace and other palace chiefs. In his analysis of these traditional guilds, Ben-Amos (1980: 9) has noted that there are guilds for leopard hunters, drummers, executioners, astrologers and land purifiers. Among these guilds were craftsmen who produced brass, ivory, wood sculpture etc for the King (Oba). The guilds were located in special wards within the Kingdom, and as previously noted around the Oba's palace. Notably, the activities of the guilds were supervised by the Iwebo, Iweguae and Ibiwe palace societies. These societies according to Barbara (2007) are led by high-ranking palace chiefs. The roles of these palace societies may have helped in the sustenance of the variety of arts and crafts in Benin Kingdom.

Dating from traditional times, the Benins have been known for their use of brass or 'eronwon' in famous art works. Benin brass castings are outcomes of 'Cire Perdue' casting technique of metal casting. Before appraising the Cire Perdue casting process, it is imperative to point out that brass (an alloy of copper and tin) is used mainly for Igun castings and not bronze (an alloy of copper and zinc). But the term bronze is commonly used in describing castings done with both alloys. This may have resulted from the fact that both non-ferrous metals share a lot of physical and chemical properties like colour and resistance to corrosion. Cire Perdue oftentimes referred to as lost wax process of casting has proven to be very effective since its use for metal casting in Benin dating back to about the 16th or 17th century. In this casting technique, beeswax is moulded over clay core, which is covered with a layer of laterite, banded and dried. The wax is then melted and replaced by molten metal. This is allowed to cool, and the outer clay chipped away leaving the casting. This cast is then dressed (filed and chiseled). Sometimes, very large pieces have their parts cast separately after which they are welded to make the whole.

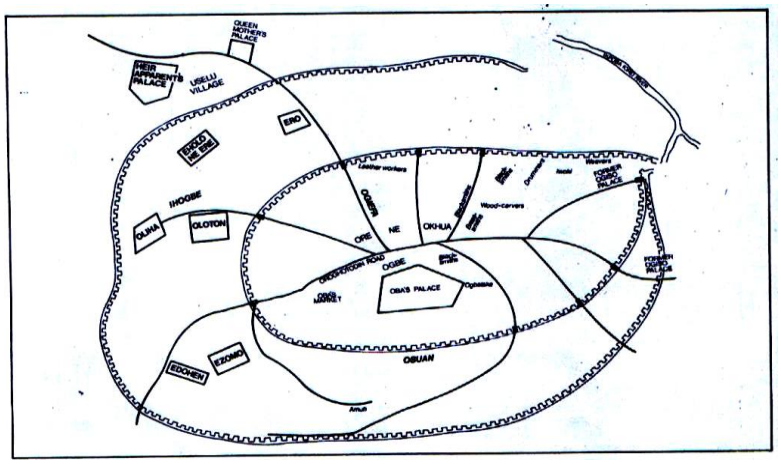

Fig. 1a: Map showing the location of traditional guilds in Benin (Present day Igun street brass casters, inclusive as seen in fig. 1b).

Fig. 1b: Sakponba Road entrance to Igun street showing a façade announcing the Guild of Benin Bronze Casters. Photograph by Kingsley Emeriewen, 2018.

In Igun street some manual and energy sapping processes involved in brass casting/finishing have been modernized lately. For instance, the bellows-driven furnace has been replaced with the introduction of air-conditioner and automobile motors powered by automobile batteries. Also, electrically operated disc sanders with different accessories are been used instead of the manual hand files. Essentially, finishing of Igun brasses is mostly at the discretion of the caster. However, a majority of more recent castings tend to portray lustre. Most casters who prefer the 'shinny' lustre on the castings employ fine-sand and lime in 'washing' the castings. This finishing option though produces expected results, is not quite permanent. Upon exposure to atmospheric conditions, the lustre on the casting begins to oxidize. Even at that, the brilliance of Benin brass works is highlighted in phrases like '...Benin bronze castings astonished, the puzzled European curators...', 'Benin bronze casting tradition is an African accomplishment that can be compared to the best of casting traditions in Europe'. The foregoing no doubt attests to the technical virtuosity and aesthetic excellence of Benin brass castings. It is in this same context that in more recent times, it could be said that the Igun casters have also diversified their range of products. They produce ornamental accessories for gates and railings, adornments for hotels and cars, jewellery pieces, gifts and memorabilia. Figures 2a – 7 show some outcomes from Igun street metal casting.

Fig. 2a.

Fig. 2b

Fig. 2c.

Fig. 2d.

Fig. 2e.

Figs. 2a – 2e: Brass floral forms at different stages of finishing. They are part of a gate design cast at Igun street, contracted to a metal design student, Fine Art Department, University of Benin for mechanical polishing. Location as at the time of documentation: Fine Art Department, University of Benin. Photographed by Kingsley Emeriewen, 2018.

Fig 3a.

Fig. 3b.

Figs. 3a & 3b: Brass heads cast. Location as at the time of documentation: Igun street. Photograph by Kingsley Emeriewen, 2018.

Fig. 4: 'Iyoba' (Queen Mother) brass head cast in Igun street. Location: Private collection of Emeriewen Kingsley, Benin City. Photograph by Kingsley Emeriewen, 2018.

Fig. 5: 'Rago Head' (Head of Ram) Trophy. Cast in aluminum at Igun street. Location: Private collection of Emeriewen Kingsley, Benin City. Photograph by Kingsley Emeriewen, 2018.

Fig. 6: Brass Coat of Arm cast in Igun street. Location as at the time of documentation: Igun street. Photograph by Kingsley Emeriewen, 2017.

Fig. 7: 'Oil Worker' brass casts meant for award plaques design cast at Igun street. This portrays mass-production possibilities of metal casting. Location: Metal Design Unit, Department of Fine and Applied arts, University of Benin. Photograph by Kingsley Emeriewen, 2016.

Metal Casting Curriculum of Fine and Applied Arts Department, University of Benin

So far, we have attempted an appraisal of what obtains by way of metal casting in Igun street. It is also imperative at this juncture, by way of some comparative judgements to articulate the specified curriculum and course content as prescribed by the Art school of University of Benin. Importantly, such courses are drawn with specific objectives which are ancillaries to the aim of the department. It is against this background that the Department of Fine and Applied art, University of Benin, has spelt out as its main aim, the need for a course of this nature to cater for the diverse academic and creative interests of students, thus providing the recipients opportunities for effective practice upon graduation.

Metal casting as a course is offered by students specialising in sculpture and metal design. Specifically, in sculpture unit, metal casting as a course is tagged 'metal casting' while in the metal design unit, it is called foundry practice. Technically, both nomenclatures have same implications. Metal casting courses for sculpture and metal design specializations are expressed in the tables below.

Table 1a: Metal Casting for Sculpture

Course code	Course title	Semester	Credits
FAS 412	Metal Casting I	First	3
FAS 422	Metal Casting II	Second	3

Table 1b: Foundry Practice for Metal Design

Course code	Course title	Semester	Credits
APM 314	Foundry Practice I	First	3
APM 324	Foundry Practice II	Second	3

From the above, the expression indicates that metal casting for sculpture students is taken at the second year of specialisation (fourth year of study). This runs through the first and second semesters of that year. The course as seen in table 1a introduces the students to practical methods and techniques of metal casting. An analysis of the course reveals that it involves both the theoretical and practical aspects. However, the students are firstly exposed to the theoretical, which is basically acquisition of knowledge in metals and casting alloys, as well as their melting temperatures. This tends to set the pace for practical knowledge in Cire Perdue, mould, core materials, direct wax modelling, investment casting as well as technical details of metal casting process. These form the scope of the course. This course also exposes sculpture majors to casting tools, materials and safety precaution in casting practice. On the other hand, Foundry practice for metal design specialists as shown in table 1b is taken in the first year of specialisation (third year of study). Like the case in metal casting, foundry practice spans both first and second semesters. It exposes the students to principles of design in cast products. It offers the students a firsthand knowledge of equipment and tools employed in ferrous and non-ferrous metal casting. Significantly, in line with the industrial nature of metal design outcomes, pattern making (single and split) and industrial metal casting processes are emphasised. Knowledge of furnace and melting techniques are also highlights of foundry practice course.

The foregoing structure of the metal casting course curriculum leaves one with high expectations from the specialising students of sculpture and metal design. This is not unexpected given the details of the courses. However, the reality may not be quite same. This leads to the basic question as to how these courses are taught. The answer may not be farfetched especially with the growing trend where specialising sculpture and metal design students have cause to go to Igun street to complete their metal casting exercises. Figures 8 – 9b captures students wax models intended for metal casting at Igun street.

Fig. 8: Wax model of car emblem by a sculpture student. Location: Fine and Applied Arts Department, University of Benin, Benin City. Photograph by Kingsley Emeriewen, 2017.

Fig. 9a. **Fig. 9b.**

Figs. 9a & 9b: Wax model of a medallion and coat of arms by a metal design student.
Location: Fine and Applied Arts Department, University of Benin, Benin City. Photograph by Kingsley Emeriewen, 2018.

In figures 10a and 10b, the former is the wax model before its casting at Igun street. While the latter is the brass cast.

Fig. 10a. **Fig. 10b.**

Figs. 10a & 10b: Wax model and brass cast of a contemporary pendant (A jewellery assignment) cast at Igun Street. Location: Fine and Applied Arts Department, University of Benin, Benin City. Photograph by Kingsley Emeriewen, 2018.

Fig. 11: 'Trumpeters' (metal casting assignment by a post graduate sculpture student cast at Igun street). Location as at the time of documentation: Fine and Applied Arts Department, University of Benin, Benin City. Photograph by Kingsley Emeriewen, 2018.
Of noteworthy is the application of brass castings in other medium of expression as seen below.

Fig. 12: A brass cast of an Eagle used in an award plaque. The eagle is cast at Igun street.
Location: Private collection of Emeriewen Kingsley, Benin City. Photograph by Kingsley Emeriewen, 2017.

Appraising the place of Apprenticeship System in Formal Learning

The concept of education has been variously defined. In a most simple definition education could be described as a process of "enculturisation" or "socialisation". It is also in this regard that Fafunwa (1982) defined education as a process of transmitting culture for continuity and growth and for dissemination of knowledge. In other words, education aims at a transmission of processes and activities desirable to individuals as well as to the society. Looking at this from a philosophical perspective, it implies that education is an intentional act aimed at bringing about "a desirable state of mind". This is turn makes the educational process and activities involved in, a worthwhile venture. Generally, therefore, one can say education involves the development of the learner's intellectual and occupational capacities. In the same vein, we can also say education is concerned with developing the individual's intellectual abilities, his vocational skills and aptitudes, as well as help him develop prosocial attitudes. Having attained right attitudes, knowledge and skills, such an individual becomes socially adjusted and economically efficient.

Significantly too, education could be formal or informal. The formal system of learning involves organised classroom teaching with a specified curriculum content. According to Coombs (1975), formal education comprises of relatively standardized and interrelated parts. On the other hand, Omolewa (1981) has asserted that informal education is not oftentimes structured; rather, it is acquired under informal situations. However, he also opined that even in such informal situations, learning processes are undertaken. When such an informal situation is further deliberately planned learning could take place under a relaxed atmosphere. Informal education is therefore somewhat related to out-of-school education, where the learners can outside the classrooms walls acquire appropriate skills and knowledge. This is actually the premise from which the crux of argument in this article stems.

Basically, the apprenticeship system of learning may be described as quite informal. This is in the sense that it is not purely academic with its specified curriculum content. Even at that, apprenticeship training plays a crucial role in equipping the apprentice with skills, competence and know-how that encourages excellence, enhances productivity and quality of outcomes. This undoubtedly makes the apprenticeship system of learning a main provider of skills and competence in informal learning situations. It is in this same context that Obidi (1995: 371) has described apprenticeship as a form of on-the-job training in which young people learn by doing under supervision and guidance. In this learning system, skills in arts and crafts are learnt and acquired. It can also be said too, that the apprenticeship training enables apprentice receive specialised training directly from their jobs.

In also articulating the importance of the apprenticeship training, and using the case of apprenticeship in Tailoring, Lave (2009: 182) has argued that the supposed stereotype nature often associated with informal learning (as against the formal) in some quarters may not be quite so. In citing instances, he argued that even though the "Master-teacher" does not deliberately organise most of the learning activities of his apprentices, there is quite some considerable structure in the learning process that the apprentices go through. In his views therefore, the learning process by which apprentices acquire knowledge and skills "are not haphazard, not osmotic, and not passively observational or imitative ... perhaps more important, the learning process apprentices engage in, change in predictable ways". Without gainsaying therefore, one

can say apprenticeship training is crucial to a nation's development of human resources, and ultimately, that nation's economy.

In the history of various societies, there is a long tradition of apprenticeship system as an approach to developing productive skills. In Nigeria, Fafunwa (1982) has recognised vocational training through apprenticeship system in traditional Nigerian society. This system has also been identified as a time-honoured avenue for educating many African youths and adults. In this traditional apprenticeship system, children were sent out by parents to relatives and Master craftsmen in particular fields. The aim was not just to acquire competence and skills, but a trade. This was also to ensure that learning comes with discipline and concentration.

Still on the concept and practice of apprenticeship training system in indigenous Nigeria, Callaway (1964: 63) an authority in the Nigerian apprenticeship system, has aptly described it thus "...as a part of wider educational process in the indigenous society of Nigeria passed on their cultural heritage form one generation to the next". In essence, Nigeria has long recognised apprenticeship training as a cost-effective way of providing for its recipients, knowledge and skills in trades, as well as equipping them for a productive world of work. Drawing from this, Odiboh (2018: 2) says modern artists by may be university or workshop trained as well as self-taught or trained through the apprenticeship method in a local tradition. It is against this background that this article re-visits the apprenticeship system of training. The focus in this case is the 'Igun Street' Brass casters' guild. This guild has a long history of providing skills in brass casting through the apprenticeship system. Specifically, the commitment in this article is a conceptualisation of the Igun street apprenticeship training as a basis for possible integration and a collaborative relationship with the University of Benin art school.

Essentially, the expectation is that in a formal art school, like that in the University, students in any specialised art areas ought to be properly grounded in theory as well as practice. This is in the sense that there is a clearly defined curriculum that encompasses academics as well as practice. While the former may be often quite available, the latter most times has its limitations. There is no doubt that the Universities (in this case, University of Benin) provide some of the needed machines and equipment. Even at that students still need that practical experience not readily available within the walls of the University. This may be one reason why students offering metal casting in the past years have made it a practice, unofficially though, to visit the Igun street guild of brass casters. The major idea is to broaden their knowledge and skills in metal casting. In essence, the students in training have recognised that these local casters, irrespective of some crudity in their productions possess some skills that give their outcomes a tinge of finesse.

It is on this score that the central argument in this paper is the need for a more formal collaboration between the University of Benin art school and the Igun street guild of brass casters. In other words, having identified the importance of apprenticeship training in learning, a formal integration could be introduced where the art students can learn as apprentice under the careful supervision of the Igun street casters. Notably, the importance of such informal learning situation has been long recommended by the International Labour Organisation [ILO]. Specifically, the ILO (2008) recognised the relevance of the apprenticeship system through vocational training.

At this juncture, it becomes imperative to highlight the possible types of apprenticeship training and identify which one may be specific to the context in this paper. In other words, what kind of apprenticeship training (system) can be employed to bring about a more formal collaborative effort between the University of Benin art school and the Igun street brass casters. This is with an ultimate goal of producing graduates in metal design and sculpture who would always appreciate the need for best practices in metal casting.

There is the popular traditional apprenticeship training, from which all other types may have taken their roots. Significantly, this type is based on socio-cultural conventions. It is a purely informal system of transfer of skills in crafts, based on an agreement between Master crafts person and parents or guardian. In Fafunwa's (1982) description of this system in traditional Nigerian society, children were bound to follow the guidance of their parents for effective training. In this wise, parents apprenticed their children to their friends, relatives or competent craftsmen. Importantly too, according to Callaway (1964: 63), in this traditional apprenticeship type, "learning a craft often begun with personal service to the master... After some years of promising usefulness, the apprentice would be introduced to the craft of his guardian". In pre-literate Yoruba society, verbal and unwritten contractual agreement was made. Quite remarkably too, these unwritten agreements were faithfully kept and scrupulously honoured (Obidi, 1995).

The second type of apprenticeship training is closely related to the first. It is also one of a purely informal approach. However, the slight difference between the first type and this is that the majority of apprentices are not from the family, or family members of the Master craftsman. The apprentices are drawn from diverse families and places. This is quite unlike the first where oftentimes, the craft, trade or skills taught

are special preserve of a particular family, and as such highly valued and zealously guarded. Such crafts and skills were passed on to family members as family trade and cultural heritage.

Finally, there is the modern apprenticeship training. This is usually regulated by an "Apprenticeship Act". This stipulates the length of training, the training format, the number of working or training hours, the payment minimum wage etc.

Generally, from the foregoing irrespective of the type of apprenticeship training, one thing seems clearly articulated. That is each of these systems has a major goal of imparting in the apprentice(s) skills and competency in a process of cognitive apprenticeship. This is a process where the apprentice works alongside his Master craftsman to acquire tacit knowledge and vocational skills. Oftentimes such skills are acquired in a learning process of imitation and practice. Notable too, such implied knowledge in non-codifiable, and as such, cannot, in the strictest sense be taught. However, such tacit knowledge and skills can be acquired and "discovered" as the apprentice observes, and with practice, brings experience gathered to bear.

Specifically, in the case of the University of Benin sculpture and metal design students, one may not opt for a purely traditional apprenticeship training for them, or even the informal system. However, the modern apprenticeship may be a good standpoint to work from; where the "Apprenticeship Act" may be regulated to suit the context of training. This takes cognisance of the fact that these students already have some basic knowledge and skills in their area of specialisation. In this case therefore, the goal is for an integration that will focus on production techniques and work processes which will enhance effectiveness of these "apprentices". In other words, this type of apprenticeship system ensures the infusion of 'new' skills and techniques in brass casting acquired from Igun street guild into the theoretical knowledge and practical skills already acquired in the art school classrooms. The expectation is that an integration of this nature will to a good extent influence students outcomes, in terms of decent work and best practices. The student - apprentice may be better "educated" having acquired the local craftsman's knowledge, in addition to the designed and clearly defined curriculum content from school. The ultimate goal is to encourage excellence and enhance productivity and quality of outcomes.

Conclusion

The commitment in an integration of this nature allows for easy access to some form of re-training by the Master craftsman. This will no doubt strengthen the course content in metal casting for sculpture and metal design students. Furthermore, it is hoped that students with such broad-based experience will always strive towards best practices, and be well equipped for a productive world of work.

In the same vein, collaboration between the Igun street casters' guild and the University of Benin art school may also hold some benefits for the former. Specifically, it will upgrade the status of the Igun street apprenticeship training as an informal learning outlet for the acquisition of practical skills in metal casting. Furthermore, this may be an avenue to establish a platform for strengthening social partnership between both Institutions.

Lastly, by way of suggestion, the three months Industrial attachment as specified in the University of Benin art school programme for their third and fourth year of study may be well utilized in the Igun street apprenticeship training 'school'.

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