
Designers' and indigenous potters' collaboration towards innovation in pottery production

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Abstract: This paper touches on the boundaries between craft and design and innovations of the indigenous pottery in Ghana. It focuses on expanding the frontiers of production through a collaborative effort on design thinking and skills development as a starting point to new directions; it examines their response to new design thinking and new production forms which are related to their culture as well as being just novel and appealing to the current market. Two case studies in Ghana were used; female adults who have been in the art of producing pottery for over 25 years and young men who use some level of improvised machinery in producing the same. Through creative thinking and skills development, indigenous potters still maintained their cultural consciousness, satisfaction and were innovative in producing products which are relevant to their present life and market.

Keywords: design thinking; creativity; pottery; production skills; cognition.

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1 Introduction

As there is expansion in knowledge, greater development becomes unavoidable (Robinson, 2011). Production of pottery articles has been one of the professions that have been passed on from generations in Ghana and in other parts of the world. The production processes of these pottery wares have assisted in community cohesion and have maintained the cultural identity of the communities in which they are produced. The need for its sustainability is therefore paramount to nations where pottery is practised as a profession. Pottery making comes with varied significances. It engages the potters in collaborative activities, provides a space for personal expression with results in a tangible manner and has finished products that these potters are very proud of (Colman, 2006). This clearly shows that it is expedient to preserve and expand this art making if we desire to keep the cultural identity of our heritage and preserve the profession for posterity. Warnier (2007) confirmed that pottery and its production preserve and administer the 'vital substances' that ensure the continuation, sustainability and prosperity of the community.

The Vocational Education and Training (VET) sector of the European Commission recognises the support for accelerating skills development, inclusive growth and poverty reduction through economic transformation and job creation (European Commission, 2017). In a similar vein, the Skills for Africa Initiative under the African Union also seeks to effectively contribute to creating new perspectives through increased employable skills and income opportunities for young Africans. This initiative addresses access to education and employment as it is a precondition to poverty reduction as well as for political stability and sustainable development.

Johanson and Adam (2005) stated that education and training are sound investments for the individual, the employer, and the economy. Skills development for participants in the labour force is important in Sub-Saharan Africa today for several reasons. Technological change and the increased competition flowing from trade liberalisation require higher skills and productivity among workers. Skilled workers are more readily able to adapt existing knowledge and processes. Growing competitive economies benefit from their presence and their movement to more productive employment. Investing in the productivity and skills of people raises the incomes of economically vulnerable groups, thereby reducing poverty.

This study is centred on the backdrop that the traditional pottery in Ghana is endangered due to the fact that there is low patronage of their products. Many are quitting the profession because the profession is not yielding enough to sustain the families (Nortey et al., 2017). Nortey et al. (2013) recommended the need for design thinking and spurring innovation in form as a way of revitalising and sustaining pottery production. Similarly, Frater (2003) noted that in India, traditional crafts are endangered because there is low attention given to the craft that needed the attention of the artisans themselves. Frater (2003) also questioned the need for the artisans to apply their ability to innovate toward making art appropriate for the current market. Similar situation is recorded in Ghana which calls for critical look at nurturing the essential element of pottery production which is one of the biggest forms of our cultural expressions.

The need for increasing patronage of pottery products cannot be overemphasised especially when there is competition from similar imported products and the plastics industries. The need for new works also stems from the fact that it is imperative to preserve the intangible cultural heritage of our indigenous communities by making the pottery relevant to present life. By increasing patronage of these pottery products, simply means redesigning and rethinking the same products but in very appealing forms which will attract the current market.

It is therefore imperative to understand these indigenous potters' socioeconomic conditions, and develop their production techniques, culture, tradition and beliefs. The study accepts the need to respect the traditions of the potters and assist in spurring innovations in forms and finishes whilst maintaining the standard. This obviously requires more significant in-depth understandings of what they produce and how to maintain the culture through the developed products whilst satisfying the appeals of the distant market.

Nortey et al. (2014) worked on expanding the frontiers of pottery production in the Nanumba South District of Northern Ghana with the view to support future generations, and to foster and strengthen a healthy community that leads to a more sustainable society. This is very important as looking for economic stability in the big cities and overseas is a challenge. At two pottery centres in Afari and Mfensi township which lie at the periphery of Kumasi (second largest city in Ghana), reports from potters coupled with personal observations confirm that the demand for the pottery products has declined drastically. In the era of stiff competition from the plastics industry producing products of similar functions, there is the need for design revision, product development and reduction in reliance on government for increase in demand. This project looks at developing the skills of these skilled potters and improving their thinking on designing and productions skills in order for them to compete on the market. The need for exceptional designers has never been stronger. Designers must possess the ability to address and find innovative solutions to the emerging and ever changing challenges of present and future society (Hargrove, 2012). Recognising possibilities requires that designers have an understanding of design thinking and process.

The study therefore examined the collaboration between designers and craftspeople in pottery production with the view to understanding their design thinking and skills as a departure to innovative products without cultural losses and assist them to produce new products whilst maintaining their cultural heritage and satisfaction.

2 The indigenous potters at the centres

The indigenous potters used in the study have been practising pottery making throughout their lives. The profession has been passed on from one generation to another and they have developed the skills and dexterity for pottery making.

At Afari Pottery centre, the profession which once was the source of livelihood for the people and second source of employment (the first being farming) has only four elderly women producing earthenware bowls. In the past, every household was involved in pottery making. The least working experience among these female potters is 25 years. They produce mainly earthenware bowls which are predominantly used for grinding vegetables such as pepper, garden eggs, tomatoes, etc and also for serving dishes. They

dig their clay which is the main material for their production from a nearby river and season the clay in the open for production. They have a dome-like shaped kiln for firing of their wares. The maturing temperature of the wares being fired is based on change in colour of the ware and largely on experience. The source of fuel for the kiln is firewood. They are normally at the mercy of the weather for drying and have a small shed for burnishing and keeping of finished products. The design concept of their products is monotonous. It is round shaped and spherical in form with ring incisions inside to assist in grinding and shredding of vegetables. Figure 1 shows products of Afari potters

Figure 1 A participant working on her earthenware bowls (see online version for colours)



At Mfensi Pottery centre, the profession is largely dominated by young adults making pots in the open in a minimally roofed dirt yard. The least working experience is ten years. Unlike Afari pottery centre, the Mfensi centre uses semi-artisanal technique. This kind of improvised throwing wheel is turned by a hand crank mechanism during the throwing of the pieces. As a seated potter's assistant turns the crank, the potter works standing and directs the wheel-turner in terms of speed. Similarly their products are for domestic use, including a textured low bowl used for scraping or shredding food items. Their main material is clay and it is dug from the river very close to the site. The dug clay is seasoned in the open air and kneaded for throwing on the wheel. There is an improvised firewood kiln for firing of products. The design concept is same with rings at the rim and round incisions inside to assist in grinding. These products are used extensively in the culture and traditions of the people.

These two working centres were purposively and randomly chosen as case studies because they possess the characteristics of pottery production activities within the Ghanaian pottery industry. It also represents the gender perspectives to pottery production and also the different production techniques for producing the same products.

3 Working on the design thinking and cognition of the potters

Design or creative thinking includes the component skills of analysing arguments, making inferences using inductive or deductive reasoning, judging or evaluating, and making decisions or solving problems. According to Lai (2011), background knowledge is necessary but not a sufficient condition for enabling development of innovative products. This will involve fine tuning the cognitive skills of these potters to be open-minded to what is currently happening within their community by producing innovations in their pottery tradition that brings spiritual satisfaction, cultural consciousness and confidence.

To work on the cognitive and creative thinking of these potters, empirical studies point to the fact that creative thinking cannot be achieved in the absence of explicit instruction (Abrami et al., 2008; Case, 2005; Facione, 1990). This informed the study to be very clear on the instructions to enable these potters to understand the minute details of developing what they produce to meet the current taste of the public whilst maintaining the cultural heritage. Thayer-Bacon (2000) also proposed collaborative or cooperative learning between the trainers and the trainees. This study is in tandem with Piagetian and Vygotskyian traditions that emphasise the value of social interactions for promoting cognitive development. Piaget touted the instructional value of cognitive conflict for catalysing growth, typically achieved by interacting with another person at a higher developmental stage. Along similar lines, Vygotsky identified the zone of proximal development as the distance between what these potters can accomplish with the help of a more capable other (either a peer or an adult). Each of these approaches highlights the potential for cognitive improvement when these potters interact with one another as proposed by Dillenbourg et al. (1996).

These indigenous potters upon collaboration were in their comfort zone of producing wares that relate to their culture and are not ready to develop new skills. In such instances, there is the need to understand their behavioural patterns as suggested by Zachrisson and Boks (2012) to stimulate desirable outcomes such as opening up. The potters were closed-minded and became expedient that they be open-minded. An open-minded cognitive style is marked by a willingness to consider a variety of intellectual perspectives, values, attitudes, opinions, or beliefs, even those that contradict the individual's prior opinion. Open-minded individuals attend to a variety of viewpoints, consider numerous competing perspectives, and elaborate upon information in an unbiased manner (Price et al., 2015). These potters are interested in attracting markets for their products yet very oblivious to the fact that design revisions, creativity and production skills of their wares are the way forward. They believe creativity is something to learn in the classroom of formal and strict educational curricula. Kelley and Kelley (2013), explained that creative thinking, regardless of your discipline, can make you a better employee and happier – but many people must first complete exercises to loosen up their imaginations and get out of their comfort zones. Through dialogue and facilitation, the potters were taken through exercises that border on design thinking such as what will appeal to the public, norms, surroundings, etc.

Sternberg and Williams (1996) define cognition as an essential ingredient of creative thinking and to the effectiveness of designers. Creative thinking can be defined as a cognitive process of generating novel or useful associations that better solve a problem, produce a plan, or result in a pattern, structure, or product not clearly present before. This

is what these indigenous potters need to be doing in order to preserve their culture and save their profession from being endangered. Case (2005) and Willingham (2007) have worked extensively on the areas of critical thinking, and revealed that one important background to achieving success in critical thinking is that the learners should have background knowledge within the domain. This is essential if the potters are to develop their creative thinking. Bailin (2002), added that the domain-specific knowledge is indispensable to critical thinking because the kinds of explanations, evaluations, and evidence that are mostly and highly valued vary from one domain to another

The indigenous potters were engaged to understand that creativity is not just something one is born with; it is a skill one can develop by oneself or foster in others. Innovation comes with an effort. To think uniquely, one must risk being considered strange and should not worry about others' opinions of them. In order to be successful as a designer, one should get past the fear of failure. The design process includes trial and error, editing and reworking (Dee, 2013).

This study delved deep into the in-depth cognitive levels of these indigenous female potters and young male potters to think alternatively about producing other products that are more marketable but still appropriate to their culture. To do this, a dialogue process was ensued to understand their design and production challenges. The study identified semantic relationships based on a factor analysis. Our deep dialogue with these potters revealed that they were more of producers (artisans) and were interested in the technicalities of producing pots. Junaidy and Nagai (2013) discovered that, in contrast to designers, artisans tended to activate lower in-depth cognitive levels. Artisans such as these indigenous potters place greater focus on product appearance and technical aspects, such as operation (replace, reduce, etc.) and shape (waist, body, etc.). In contrast, designers paid greater attention to the presence of issues related to surroundings, such as scene (environment, ambience, etc.) and appeal (aesthetics, etc.). These results demonstrate that closely or remotely associated concepts correlate with shallow or in-depth cognitive levels based on creative solutions (Junaidy et al., 2013). It was therefore expedient that we develop the design thinking of these potters towards better patronage of their products.

4 The dialogue process and acceptance

Dialogue process played a significant role in this study. The issue of dialogic process is still not thoroughly studied under the qualitative research approach (Bresler, 2006). In this regard, careful approach of the language for the dialogue was 'twi' (local dialect) to enable them to express their opinions and thoughts during the study. Since language was not a barrier coupled with frequent visits to their working sites, a quick rapport was established between the potters and the research team.

The dialogue was on drawing their mind to the fact that government cannot do everything for them and the only way out is for them to also be dynamic in their production to meet the demands of the society. This was discussed based on historical facts and contemporary context and largely on the effect that the plastic industries have had on the profession that was once providing care and sustenance of the family. The elderly women potters just as the young potters from Mfensi bemoaned and accepted the fact that business has gone down drastically. This was the beginning of the acceptance

point of the dialogue although we could feel from the part of the women that we had come from the university to teach them something beyond them.

We secondly made them aware that the training and development would take place at their centres to make them feel more at home. In this way, potters will still have same materials and tools that they use to maintain their historical heritage and using same to develop more market-driven demand products.

5 Background to the study's strategy

The study's strategy was influenced by Knowles et al.'s (2005) Andragogy, which focuses on special needs of adult learners. Knowles et al. (2005) identified six assumptions about adult learning:

- 1 need to know
- 2 self-concept
- 3 prior experience
- 4 readiness to learn
- 5 learning orientation
- 6 motivation to learn.

These assumptions were carefully studied and applied to these potters as it deals with adults going through skills development and training.

In the first assumption a case was made for them to value their products and also accept the need to expand the frontiers for new learning and product making. These potters were very close minded and receptive to change due to cultural attachments and were expedient to work on their cognitive thinking. In the second assumption, we created a congenial environment where we made them aware that we are only facilitators to the development and that much is dependent on them for self-direction. Facilitators should create environments where adults develop their latent self-directed learning skills (Brookfield, 1991). The third strategy employed was seeing the potters as already having the richest resource for the skills and design development; therefore, tapping into their experiences through experiential techniques (discussions, simulations, problem-solving activities, or case methods) is beneficial (Brookfield, 1991; Knowles et al., 2005; McKeachie, 2002; Silberman and Auerbach, 1998).

The fourth strategy identified for this study was fine tuning their mind for expansion in production forms. Knowles et al. (2005) makes us aware that adults are (task-centred, problem-centred) in their orientation to learning. They want to learn what will help them perform tasks or deal with problems they confront in everyday situations and those presented in the context of application to real-life (Knowles et al., 2005; Merriam and Caffarella, 1998). The fifth assumption enabled the study to work on their learning orientations. Everyone wants to learn but desires to learn in a friendly and welcoming atmosphere where divergent thoughts are welcomed and used as healthy feedbacks to innovative designs. The sixth identified strategy was motivating the potters that the development of their design thinking and skills provides a basic direction for innovation in the pottery tradition that would help sustain a healthy living-spiritual satisfaction, cultural consciousness and cultural confidence.

6 Results and discussion

6.1 Understanding the design concept and skills of the indigenous potters

The potters produce earthenware bowls, water cooling pots and pots for brooding chicks. These artistic products are produced in unique spherical forms using very well mastered skills and hand forming techniques. Historical and contextual discussions with the potters coupled with observations exposed that the potters have been producing the same product with same shape since they learnt the profession. However, it was mentioned that they used to produce water cooler pots but the demand has gone down drastically owing to the use of fridges. The potters however maintained that once in a while people do place orders for the making of these water coolers. The findings show two prominent issues; first, potters holding on to traditional ways, and expanding the frontiers of the design and other shapes of products may be challenging to these potters; second, making them understand that it is a developmental process to creating forms and not a complete change. When photos of decorative pieces were shown to them they remarked 'as for this we cannot produce it, the technique and skills are above us, it is too technical'. We saw this remark as the essence of teaching. You teach to develop skills and also to add value to what already existed. What worked was that the technique of production was the same hand forming technique which these potters have already developed through their practice.

Based on Knowles et al.'s (2005) first assumption of the need to know, we engaged these potters on the need to know that it is expedient to develop their design thinking and skills. After a dialogue on this, the potters understood that it was important to produce other products in addition to their earthenware bowls to increase demand. They also added that the technical know-how for such product development has not been extended to them and might be expensive to tap. The last on the need to know was the fact that the collaboration and the production of innovative products will still maintain their cultural heritage, cultural consciousness and spiritual satisfaction.

Figure 2 Explaining the essence of skills development through dialogue (see online version for colours)



The next approach to understanding these potters based on Knowles et al. (2005) was building their self-concept and prior experience. This was not a challenge as the potters were practising the profession and had rich experience in pottery production. In addition, their technique of production is hand forming which is the key basis to the development of skills and forms. The fourth, fifth and sixth assumptions were on readiness to learn. Learning orientation and motivation to learn were achieved by making them have a positive image about the wares they have been producing and only extending them to a wider taste of consumers. The study involved them in the design thinking and never imposed any thinking on them. This gave them an open mind orientation and they shared their basic challenges of production which were mainly to do with going beyond earthenware bowls production. The study did not use English language because its usage within the context under the study limits the potters from expressing their views and concerns. The use of their local language broke the barrier of educational stratification and opened good communication flow. Figure 2 shows artist explaining the essence of skills development to the women potters.

6.2 Developing their design concept

In developing their design concept, the study used the known to the unknown approach. Having understood their design concept as spherical shapes, it was very important to teach the potters using a process that was very comfortable and engaging. The study was fully aware that both pottery centres are in the peri-urban areas and therefore source and cost of power is a big challenge. Based on this knowledge, the best tools for designing and pottery making were the hands, skills and knowledge for more self-expression. In order to install some level of confidence in the potters, they were introduced to shapes and forms. The potters have been very accustomed to producing circular or round pottery wares and therefore the need to go beyond circular designs and expand their creative designs. At Afari pottery centre where only female potters practise, there was the great challenge of them accepting the idea of using pen or pencil in sketching or drawing basic shapes and forms. It was very fascinating seeing the potters hold a pencil to draw simple shapes on drawing sheets as evident on Figure 3. The potters were indeed enthused about their sketches as they were all interested in seeing the outcome of their fellow potter's sketches. van de Lugt (2005) revealed that sketching affects the idea generation of designing. Among the shapes drawn were square, rectangle, triangle and spherical form. These were done by training them on how to hold the pencil. Initially the issue of drawing basic shapes was a challenge as potters were new to formal teaching and training. With training on how to hold the pencil and drawing of basic shapes they became a bit comfortable in using the pencil in drawing basic shapes and forms.

The elements and principles of design were thoroughly discussed with them. The wares produced by the potters are without outer designs meaning just have a smooth surface. So, the question was how to design the outer part of wares that are produced especially with decorative pieces which are fast becoming the choice of many for the beautification of the home. The study introduced them to the techniques of using the same geometric shapes and making impressions of clay slabs in designing the outer surfaces of the wares.

Figure 3 A participant going through experimental drawing to develop shapes (see online version for colours)



The potters were taken through designing of products using several of the shapes they had drawn. The training was in such a way that the thinking of the design concepts was never imposed but collaboratively done. The discussion that ensued was in what way(s) can they innovate on their products? One answered, “we can build a pot in a square form.” Others were of the view that we make it triangular, some said rectangular and some maintained the spherical shapes. It was realised by all that same decorative pots could be produced using diverse shapes and this was an indication of the beginning of the intended collaboration and development. After this session, self-confidence has become the tool to develop design thinking. Frater (2003) revealed that self confidence in the ability to solve problems is the most important and enduring benefit of developing the capabilities of a person.

6.3 Respecting traditions and innovating market favourable products

Respecting the traditions of the potters and helping the indigenous potters to innovate their products required a more significant in-depth understanding of their materiality and production procedures. Since the potters had worked with clay over the years, manipulation of the clay was not a challenge for them. This confirms the third assumption of Knowles that prior experience in the field is very good for developing the skills and thinking (Knowles et al., 2005). The development of their design thinking and concepts in production led to the production of stupendous art forms. In order to keep the tradition, one of the fascinating works produced was the baptismal bowl which is largely demanded by the same cultural traditions and newly embraced religious bodies. In Ghana, during festivals, naming ceremonies and funerals, such bowls are used as receptacles in purification rites, baptism, for storage whilst also serving as decorative artefacts. Other products such as decorative pieces for homes and offices, thrown tea sets and flower hangings were also done. Bearing in mind a period of mass production with

mass produced products being accessible by all, the slab building technique and throwing were used as quasi mass production technique to enable faster productions. Innovating their products to such forms translates to developing their products and still maintaining their intangible cultural heritage. The design was uniquely developed by the potters. Again, it is an integration of their spherical bowl and other shapes which they have been introduced to. The design concept was that the bowl sinks into the opening of the form to hold the water for baptism process.

The production started with the processing of the clay as the only material. Clays are found in abundance in both Afari and Mfensi. Although they do not have same characteristics, both clays have been studied and recommended for pottery production. The potters have good knowledge about wedging and seasoning of clay. They collect from the river site and allow it to age on site. At Afari, the clay in a very soft state is used to form the earthenware pots and at Mfensi it is thrown on a semi-mechanised potter's wheel. The clays used for the project are from their immediate environment.

Figure 4 Participants rolling their slabs for production of work (see online version for colours)



The next step was quite different from their usual processing of clay for their earthenware bowl making. A sack board and a wooden rolling pin were provided for the rolling of slabs and afterwards, it was cut into rectangular and square shapes. In this vein, kneading and rolling of slab was a new introduction. Figure 4 shows potters being introduced to rolling of slabs in order to cut out geometric shapes.

Figure 5 Assisting female participant to build on form (see online version for colours)



Figure 6 Participant sharing thoughts on sketching and building form (see online version for colours)



By the use of a cutting knife, the potters were able to cut out the various slabs for the production of the baptismal bowl. In order to have impressions on the surface as a form of design, objects from the environment were used to impress designs on the rolled slabs. The cut out shapes were kept in polythene sheets to prevent them from excessive drying. The next day was set out for scouring and joining of the various cut out shapes. The

scouring of the slabs is done by using a fork to scour the edges of the clay and when a clay slip (clay and water) is applied the two joining areas interlock. Figures 6–9 show potters building the baptismal bowl. These practical approaches enabled the potters to improve on creative thinking by apply shapes and forms. This falls in line with Pesut (1990) that the fundamental skills of creativity are really action-oriented metacognitive guides that operate in concert with metacognition to sustain and enhance creative thinking. As the potters' level of cognitive thinking increased so were their capacities to utilise their creative thinking.

Figure 7 Male participant trying hands on building forms (see online version for colours)



Figure 8 Artists explaining processes to male participant (see online version for colours)



The beginning of creative thinking was observed when the potters were able to critically evaluate the work they were producing with open-mindedness and flexibility. Figure 6 shows a potter critically evaluating the design concepts on sketching and building the forms in alternate ways to spur innovations. Lai (2011) sees this as a good sign of critical thinking. The creative thinking and cognitive skills improved the open-mindedness of the potters as they begin to question and applaud innovation in their own works.

6.4 What happens when indigenous potters are exposed to other art forms outside their comfort zone?

The participants were excited that they had acquired critical and new knowledge to improve their mindset and practice. Comments from these potters clearly point to the fact that there is hope for the development of new products and sustainability of the industry. Though their comments were varied, they all pointed to the fact that there are innovations in their profession and they were very happy to preserve and promote the vocation and heritage with new ideas. They have come to appreciate and understand the need to spur innovations in forms. Kelley and Kelley (2013) revealed that creative thinking regardless of the discipline makes an individual a better employee and happier. The potters were able to process the results of the new products because they could classify, compare and contrast their new design thinking towards new product development which could lead to a viable industry. This finding confirms Laster (1985) that learning is a building process: knowledge and understanding are 'constructed' by individuals as they process information from the environment, from their memories of previous experiences, and from their semantic structures.

The study revealed that the potters were initially not too enthused with the training, but later they were yearning for more as they started to design and produce other decorative but functional pieces for their communities and general public. They became very expressive at the end of the training. There is the fostering of active interest in the creation of new products when such skilled people are introduced to new vistas. There was a feel of satisfaction as potters showed great excitement at their new products whilst maintaining their ubiquitous pots and traditions. One new finding was that they worked collaboratively in the making of the new products unlike the former where each worked on one earthenware bowl. Another interesting finding was that it was clearly visible that the potters became more engaged in the new design concepts and shared ideas amongst themselves.

When skilful indigenous potters are exposed to wider design thinking, they produce more market-favourable products and this was evidenced by recurrent orders from their old customers and from new buyers. The potters remarked 'now when customers order their earthenware bowls they request for the decorative pieces as well'.

6.5 The new design thinking, production processes and the level of satisfaction

The potters showed a high level of satisfaction after going through the design thinking and production processes. This was realised through interactions and unobtrusive observations and participation which showed enthusiasm to produce more of similar works. Working on the potters' closed-mind to open minded cognitions, to understanding

the manipulation of shapes and forms, developing skills and techniques proved to be good learning and skills for the potters. Majority of them have had no formal education but had informal training by assisting their parents from childhood and acquiring the techniques of production over time. In this vein, they were more interested in doing the work rather than the paperwork that leads to the production.

This confirms findings from Hargrove (2012) that training artisans to explore their own cognitive processes in a systematic way helps them manage their own creative thought processes and develop their metacognitive knowledge. This training provided them with the knowledge of when, where, and why to use specific thinking strategies or cognitive approaches. Through an understanding, the potters were able to trace the successes or failures of their decision back through the process of thinking and build knowledge through past experiences. Before the dialogue process, the potters retorted upon seeing pictures of some decorative pieces and quickly remarked “these standards of artworks are beyond our capabilities.” The potters at the end of the study said “so we can also do it, we are in business now.” One could easily notice the feeling of accomplishment among the potters and the urge to practise their newly developed skills. Findings from the two case studies revealed no differences in the ability to develop the design thinking and applying the developed skills in innovating their works. The adult females and youths alike showed equal ability in producing same products. The only difference was the adult females were reluctant initially to be part of the study. This shows that adults are not deficient to reasoning as revealed by Lai (2011) but are reluctant initially to try new ideas or processes especially when they are used to a particular way of doing things. Working on their cognitive skills prepared them for the task of creative thinking.

Figure 9 The baptismal bowl and earthenware bowl just removed from the kiln (see online version for colours)



Figure 10 Indigenous potters appreciating the outcome of the baptismal bowl (see online version for colours)



7 Conclusions

The practical demonstration and facilitation of design thinking and creativity to indigenous potters in Afari and Mfensi in Ghana and have undeniably created or provided new skills development and opened new perspective within their pottery practice. Obviously the preservation of the practice will assist in accelerating their skills development and reducing poverty through alternative product development. The women and young potters' engagement in design thinking and extrapolation has opened up a broad possibility to innovate their pottery products with cultural satisfaction. Their background knowledge played a significant role in developing their creative thinking and skills as noted by Facione (1990) that although the identification and analysis of critical thinking skills transcend, in significant ways, specific subjects or disciplines, learning and

applying these skills in many contexts requires domain-specific knowledge. Through creative thinking and skills development, indigenous potters can still maintain their cultural consciousness and satisfaction and also bring innovation in their products which are relevant to present life and market. Indigenous female adult potters have the capabilities to rethink their designs and develop their skills just as the youth potters. Technical interventions for craftspeople and their product development processes are very much possible through collaboration, but must be done by bearing in mind their cultural backgrounds and maintaining high levels of their satisfaction.

References

- Abrami, P.C., Bernard, R.M., Borokhovski, E., Wade, A., Surkes, M.A., Tamim, R. and Zhang, D. (2008) 'Instructional interventions affecting critical thinking skills and dispositions: a stage 1 meta-analysis', *Review of Educational Research*, Vol. 78, No. 4, pp.1102–1134.
- Bailin, S. (2002) 'Critical thinking and science education', *Science & Education*, Vol. 11, No. 4, pp.361–375.
- Bresler, L. (2006) 'Toward connectedness: aesthetically based research', *Studies in Art Education*, Vol. 48, No. 1, pp.52–69.
- Brookfield, S.D. (1991) *Understanding and Facilitating Adult Learning: A Comprehensive Analysis of Principles and Effective Practices*, Jossey-Bass, Inc, California.
- Case, R. (2005) 'Moving critical thinking to the main stage', *Education Canada*, Vol. 45, No. 2, pp.45–49.
- Colman, A. (2006) *Cultural Anthropology*, 8th ed., McGraw-Hill Higher Education, USA.
- Dee, M. (2013) 'Fostering and creativity', *The 3rd International Conference for Design Education Researchers*, Vol. IV, No. 2, pp.1349–1361.
- Dillenbourg, P., Baker, M., Blaye, A. and O'Malley, C. (1996) 'The evolution of research on collaborative learning', in Spada, E. and Reiman, P. (Eds.): *Learning in Humans and Machine: Towards an Interdisciplinary Learning Science*, pp.189–211, Elsevier, Oxford, England.
- European Commission (2017) *Report on the Vocational Education and Training* [online] <http://www.europeaid/humandevlopmentsector> (accessed 29 June 2017).
- Facione, P.A. (1990) *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction*, The California Academic Press, Millbrae, CA.
- Frater, J. (2003) *Traditional Art in the Eye of the Artisan: Changing Concepts of Art, Craft and Self in Klutch*, Seminar, New Delhi
- Hargrove, R.A. (2012) 'Assessing the long-term impact of a metacognitive approach to creative skill development', *International Journal of Technology Design*, Vol. 4, No. 2, pp.1–29
- Johanson, R.K. and Adams, A.V. (2004) *Skills Development in Sub-Saharan Africa*, World Bank Regional and Sectorial Studies, World Bank, Washington.
- Junaidy, D.W. and Nagai, Y. (2013) 'The in-depth cognitive levels of imagination of artisans and designers', *Journal of Design Research*, Vol. 11, No. 4, pp.317–335.
- Junaidy, D.W., Nagai, Y. and Ihsan, M. (2013) 'Craftsmen versus designers: the difference of in-depth cognitive levels at the early stage of idea generation', in *ICoRD'13*, Springer, India, pp.223–234.
- Kelley, T. and Kelley, D. (2013) *Creative Confidence*, Crown Publishing Group, New York.
- Knowles, M.S., Swanson, R.A. and Holton III, E.F. (2005) *The Adult Learner: The Definitive Classic in Adult Education and Human Resource Development*, 6th ed., Elsevier Science and Technology Books, California.
- Lai, E.R. (2011) *Critical Thinking: A Literature Review*, Pearson Publication, New York.

- Laster, J.F. (1985) 'Toward excellence in vocational education: using cognitive psychology in curriculum planning', *Information Series No. 297*, The National Center for Research in Vocational Education, Columbus, The Ohio State University, pp.254–656.
- McKeachie, W.J. (2002) *McKeachie's Teaching Tips: Strategies, Research, and Theory for College and University Teachers*, 11th ed., Houghton Mifflin Company, Massachusetts.
- Merriam, S.B. and Caffarella, R.S. (1998) *Learning in Adulthood: A Comprehensive Guide*, 2nd ed., John Wiley & Sons, Inc, California.
- Nortey, S., Asiamoaso, E. and Okai, E.K. (2017) 'The socio-economic effect of the decline of pottery on four centres in Ghana', *Journal of Sunyani Technical University*, Vol. 2, No. 3, pp.12–22
- Nortey, S., Okai, E.F. and Bodjawah, E.K. (2013) 'Breaking monotony: a reflective study in teaching decorative pot making', *Teaching Artist Journal*, Vol. 11, No. 2, pp.69–80.
- Nortey, S., Wumuaja, N. and Okai, E.K. (2014) 'Expanding the frontiers of pottery production in the Nanumba South District of Ghana for social sustainability: an experiment with the youth', *Teaching Artist Journal*, Vol. 12, No. 3, pp.139–154.
- Pesut, D.J. (1990) 'Creative thinking as a self-regulatory metacognitive process – a model for education, training and research', *Journal of Creative Behavior*, Vol. 24, No. 2, pp.105–110.
- Price, E., Ottati, V., Wilson, C. and Kim, S. (2015) 'Open-minded cognition', *Personality and Social Psychology Bulletin*, Vol. 41, No. 11, pp.1488–1504
- Robinson, K. (2011) *Out of our Minds: Learning to be Creative*, p.171, Capstone, Oxford.
- Silberman, M.L. and Auerbach, C. (1998) *Active Training: A Handbook of Techniques, Designs, Case Examples, and Tips*, 2nd ed., John Wiley & Sons, Inc, California.
- Sternberg, R.J. and Williams, W.M. (1996) *How to Develop Student Creativity*, Association for Supervision and Curriculum Development, Alexandria, VA.
- Thayer-Bacon, B.J. (2000) *Transforming Critical Thinking: Thinking Constructively*, Teachers College Press, New York, NY.
- van de Lugt, R. (2005) 'How sketching can affect the idea generation process in design group meetings', *Design Studies*, Vol. 26, No. 2, pp.101–122.
- Warnier, J.P. (2007) *The Pot-King: The Body and Technologies of Power*, IDC Publishers, Koninklijke Brill NV, The Netherlands, Leiden.
- Willingham, D.T. (2007) 'Critical thinking: why is it so hard to teach?', *American Educator*, Vol. 31, No. 3, pp.8–19.
- Zachrisson, J. and Boks, C. (2012) 'Exploring behavioural psychology to support design for sustainable behaviour research', *Journal of Design Research*, Vol. 10, Nos. 1/2, pp.50–66.