Prospects of Achieving Economic Recovery in Nigeria through Industrial Design Education

By

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Abstract

Today, Nigeria is bedeviled by an ailing economy, which need be revamped through material culture development that meet user needs at local, national, and international levels. A key way to achieving this, is mass production by industrial methods, where industrial design education is indispensable. Therefore, this paper focused on industrial design education as panacea for economic recession. Towards this end, a discursive approach that utilized the critical-historical-analytic examination method was employed. The paper introduced the reader to the need for industrial design and its education to achieving economic recovery. Furthermore, it copiously discussed the prospect of achieving economic recovery through industrial design education in Nigeria vis-à-vis Beal and Meehan model of knowledge production and utilization. The paper found that industrial design education could occasion economic recovery when unemployed citizens are imparted with skills and technical know-how to produce and translate knowledge into products that meet user needs. The paper ended with the need for readiness of designers, educators, manufacturers and policy makers to collaborate in problem-solving connected with product development that would be industrially mass produced, in order to realize a robust economy.

Keywords: Economic recovery, Industrial design education, Material culture development, Production.

Introduction

Today, Nigeria is bedeviled by an ailing economy, which is largely predicated upon massive importation of a wide range of functional and aesthetic products that immensely affect our everyday lives. Examples include transport and communication gadgets - cars and telephones; domestic utilities - kitchen utensils and household furniture; and instructional materials – pencils and markers. The result includes trade imbalance and deficit that have grave consequences for economic development, which include inflation, currency devaluation, and low standard of living.

The above situation has caused much misery, poverty, unemployment and insecurity. We can readily see this in the ever-increasing rate of crime, insurgency, youth restiveness and violence across the country as exemplified by Miyitpi Allah Cattle Rarer Association, Boko Haram, Odua People Congress, Indigenous People of Biafra, and Niger Delta Militants, to mention a few. In addition, the consistent neglect of structural and human development initiatives have triggered much unrest in the Nigeria society. An example is the incessant strikes embark upon by workers unions: Academic Staff Union of Universities (ASUU), Nigeria Medical Association (NMA), and Nigeria Union of Petroleum and Natural Gas Workers (NUPENG), potently harangue the mounting dissatisfaction in the country.

From the foregoing, the need to have a drastic paradigm shift from a culture of predominant consumption and gross dependence on importation, to a culture of persistent productivity and self-reliance with significant high level of exportation cannot be over-emphasized. Towards this end, industrial design education is salient for the needed knowledge, skills and training required for success, development, and production of the much desired products we ride in, speak through, write with, put on, store

in, eat from and so on that are mass produced by industrial means. A paradigm shift is critical for Third World countries, such as Nigeria, where the need to leapfrog the economy is a matter of urgency. Ohene-Boi (2002:199), states that " in the real sense, the development of a nation is predicted (sic) upon the overall development of national resources (both human, environmental and material) required for the total national well being (sic) at present and for reassuring growth in the future".

Fortunately, Nigeria is endowed with abundance of human and natural resources that could be harnessed to transform her economy from its present weak and poor state into a strong and rich one. A major way to achieving this, is necessary and sufficient knowledge and skills acquisition for material culture development and production. This is a critical objective and predominant enterprise of Tertiary Technology Education (TTE), and Technical and Vocational Education and Training (TVET). TVET is a broad term that refers to "those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life" (Nigerian Educational Research and Development Council – NERDC 2013: 24).

Industrial design education is a TTE and TVET programme. Its objectives include the impartation of knowledge and skills that equip the individual to function efficiently and effectively in society, and be self-reliant. This is with the overall aim of individuals making positive contributions that cumulatively aggregate national socio-economic development and higher standards of living. So, individuals being furnished with needed knowledge, skills and training is of paramount importance for industrially mass produced products because these products are largely hinged on industrial design drafts, which constitute the preparatory - conceptual and planning stages of product development, packaging, and graphic communication (Ebigbagha, 2016).

Industrial design education interfaces design and learning in areas of specialization that includes Ceramics, Glass, Textiles, Metal, Graphics and Product Design. It is been practiced in Nigeria long before it was first named as such: Department of Industrial Design, in Ahmadu Bello University Zaria in 1977. Before then, subject areas of specialization in textiles, ceramics and graphics design were taught along with painting, sculpture, art history and art education in the departments of Fine and Applied Arts, Creative Arts, Vocational and Technology Education, and Visual Arts at all levels of education; particularly in Colleges of Education, Polytechnics and Universities.

However, industrial design education, as in Ahmadu Bello University (ABU), would be adopted, although not limited to it as the vademecum in this paper. This is premised on the fact that ABU is where industrial design (as a nomenclature to a department) started in Nigeria. Again, it has metamorphosed from a department into a faculty in 2016 because of the realization of its enormous prospects to leapfrog the Internally Generated Revenue (IGR) of the university. Besides, industrial design education has been practiced in ABU for about forty years and its graduates have continued to train individuals in other institutions across the country. Nevertheless, products would be gleaned from similar programmes and institutions could be cited for the purpose of clarification.

In addition to the above, industrial design education integrates design and learning in order to score indelible behavioral pattern on the mind of the learner. This would make it habitual to acquire, generate, utilize and translate knowledge into products creatively, meet user needs and improve existing standards of living. The process of knowledge production and utilization in industrial design is complex. It involves many interrelated activities, functions and processes. This includes the activities of knowledge production, management and translation as well as product development, dissemination and utilization; however, emphasis would be focused on knowledge production and product development because these stages necessarily and sufficiently meet the purpose of this paper. Also, it

involves the activities of definition, analysis, ideation, selection, implementation and evaluation in the process of problem-solving, which underlies form-generation that meet user needs (Wallschlaeger and Busic-Snyder, 1992). These complicated activities, functions and processes could be ambiguous if not discussed in the light of existing theoretical frameworks. Towards this end, the Beal and Meehan model, is a general structure of knowledge production/utilization that is suitable to guide our discussion on form-generation/material culture development.

Furthermore, when unemployed people are equipped with skills and knowledge that affords translation of knowledge into valuable and functional products, collective productivity that aggregates wealth is prospected. Therefore, we would examine the prospects of achieving economic recovery through industrial design education vis-à-vis the Beal and Meehan's model of knowledge production/utilization. And we would briefly highlight some challenges in industrial design education in Nigeria.

Prospects of Achieving Economic Recovery through Industrial Design Education

To equip the individual in society with the know-how to produce and translate knowledge into products that satisfy needs is critical to development. A comprehensive knowledge of the feature, process and system as well as the contrast, variation and distribution of a given product, and the knowledge, aptitude and practices of a people are critical to creatively generate functional and aesthetic products (Ebigbagha, 2016a, citing Sefertzi, 2008; and Buchana, 1995). So, it is needful to understand how knowledge is generated and used in industrial design education to develop products. Towards this end, the Beal and Meehan's model of knowledge production and utilization provides an adequate guide.

Beal and Meehan (1978), presented a general model of knowledge production and utilization (figure 1). It identifies six categories of interrelated functions, activities and processes necessary to produce and use knowledge. These are: (i) Knowledge-production, (ii) Knowledge-

management, (iii) Knowledge-translation, (iv) Product-development (v) Product-dissemination; and (vi) Product-adoption/ utilization. Here, these are labelled KP, KM, KT, PDE, PDI, and PAU respectively.

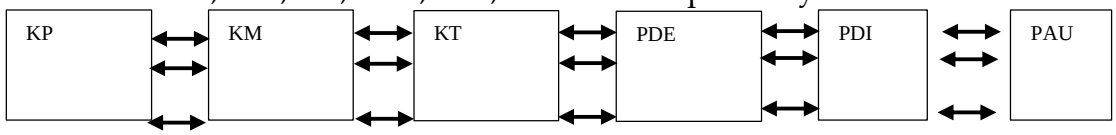


Figure 1: A general model of knowledge production/utilization showing six categories of interrelated functions; and processes necessary for knowledge production/utilization (Beal and Meehan, 1978)

The development of a product usually begins with information search, which would produce knowledge to facilitate a thorough grasp of the product to be created and mass produced. Beal and Meehan (1978), described/prescribed knowledge production in terms of purpose - as a product of Basic Research and Applied Research, which has nine steps, and ten steps respectively. These steps are: (i) Identify user needs (Applied Research only) (ii) Depict problem (iii) Review research (iv) Relate variables, (v) Conceptualize problem (vi) Test hypotheses (vii) Conclude from tests (viii) Package result (ix) Communicate result; and (x) Evaluate methods.

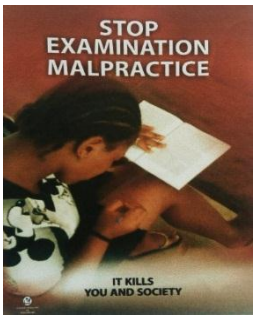
The above emphasises identifying user needs, defining problems and making findings based on conclusion from results that are tested, effectively communicated and evaluated. This is salient for producing worthwhile knowledge for industrial design products.

Industrial design education, usually hinges training on applied research, where identifying user needs is the genesis of the process to satisfactorily resolve a given design task. At the undergraduate level, these tasks are often presented in hypothetical form, whereby possible design problems in reality are simulated for students to resolve in the class/studio. This starts from Basic Design classes in year one and two through specialization classes in year three and four/five in Ceramics, Glass, Graphics, and Textiles Design. Examples of hypothetical assignments include making of a set of bowls, making of a set of glass teacups for five

star hotels in Nigeria, making of a poster for the campaign against examination malpractices in tertiary institution, and making of a design for textiles material to be used by Farmers Association in a given area. Examples of products executed through hypothetical assignments are shown (See Plate 1).



A set of Ceramic Saucer, Teacups and Mug



A Graphics Poster on Examination Malpractice



A collection of Textile Fabrics

Plate I: showing products of hypothetical assignments during industrial design education in Ceramics, Graphics and Textiles sections respectively, in Niger Delta University, Nigeria.

In addition to the above, at the postgraduate level, the conducted researches are often applied types, which are based on problem-solving that serve primarily functional purposes. Few typical examples include the 'Utilization of Local Raw Materials for the Production of Dense Alumminosilicate Refractory Bricks for Blast Furnaces Using Semi Dry Pressing Technique'; and 'Design, Construction, and Operation of a Multi-Fuel Firing kiln for Ceramic Production', which are efforts on kiln development adapted to existing local conditions; Graphic Encoding Choices in Development Communication : Identifying the Several Loops of the Graphic Encoder/Media Team Collaboration, which presented the critical points of collaboration during media production process for effective graphic communication materials that support development initiatives; and and 'Exploration Study of the Modern Macrame with Beads Ornamentation for the Production of Fashionable Female Dress Accessories' an affort towards the exploration of local materials for the

production of accessories for fashionable dresses; (Sullayman, 2006; Etuokwu, 2012; Ebigbagha, 2010; and Jonathan, 2016 respectively).

The foregoing suggests that individuals are often directed to engage in inductive activities, whereby studies are conducted and references made to existing idea, product or information. This produces knowledge, and immensely impact on the creative process of product development. When individuals become conversant with how to produce relevant knowledge to meet user needs, they often engage themselves in activities that contribute to solving existing problems.

The above is exemplified by the production of knowledge about the suitability of the abundant clay deposits in Bayelsa State; and the use of such knowledge for ceramic production at commercial levels (Etuokwu, 2017). Invariably, this effort provides a hint of available latent natural resource with the potential that should play a very significant contributory role (when given institutional, organizational or government support) to revamping the economy, reduce unemployment and minimize youth restiveness as well as related problems in Bayelsa State in particular and Nigeria in general.

Another good example of applied knowledge production towards developing the economy, is expressed in Dajoe Pottery Limited, Makurdi. Here, Yakubu, its Executive Director and owner, and a graduate of the department of industrial design, ABU, employed computer-aided design to generate beautiful scenes on industrially mass produced tiles and ceramic wares at commercial levels. This was in order to meet identified user's need for heightened aesthetics combined with functionality. Again, an example worthy of mention is Yaliam Press Limited. where its Executive Director and owner, Yahaya Amfani, engages the training he had from industrial design education, to produce knowledge that continually resolve printing and design tasks from within and outside Nigeria (e.g. security designs such as bank cheques from East Africa, West African Examination Council question papers, UNESCO reports and books, and JAMB question papers, to mention a few). These result in substantial amount of money earned,

saved, and taxed that should be employed in resolving human and structural development issues in Nigeria.

From the above, it is apparent that the process of product development based on knowledge production in the course of industrial design education, instils discipline on individuals to direct, organize, and manage information and knowledge gained in the course of research to resolve design tasks. This is the reason for the support of Swipe Files (where a variety of interesting visual images are stored for the purpose of references, as an album – a collection hinged on individual preferences) in industrial design education, particularly in Graphic Design. The knowledge gained from research is critically analyzed, and the most appropriate ideas, which are prospective of providing satisfactory resolutions to the identified user needs are noted, ordered, and set aside safely for implementation. For example, in the media production process of the Information, Education and Communication (IEC) materials for the Delayed Sexual Debut Campaign in Nigeria (with the catch phrase 'ZIP-UP' and tagged 'Make We Talk', by the media production team of Society for Family Health – SFH, in collaboration with the National Agency for the Control of AIDS - NACA, in order to minimize unwanted pregnancies, HIV/AIDS and other sexually transmitted diseases), the Creative Brief, aptly presented the research knowledge, upon which the graphic encoders, LTC-JWT Advertising Limited, Lagos developed a superb graphic media that effectively communicated the prime messages and supporting information with decisive salutary effect(SFH, 2006; see plate II).

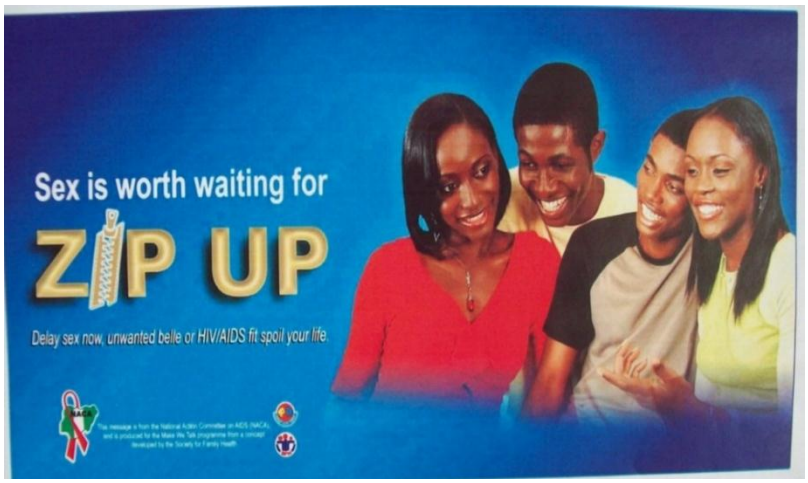


Plate II: A billboard poster on Sex is worth waiting for 'ZIP UP' by Society for Family Health

This step of organizing an ordered arrangement of indispensable information from research produced knowledge and information is succinctly described as Knowledge Management, the second of six stages in the process of Knowledge Production/Utilization (Beal and Meeham, 1978).

Beal and Meeham, 1978, identified seven stages of Knowledge Management: (i) Identified user needs (ii) Monitor/Screen research (iii) Catalogue (iv) Package (v)Store (vi) Disseminate; and (vii) Evaluate operations. So, the management of knowledge begins with identified user needs, and relating knowledge produced from research to identified needs through monitoring/screening. Also, it prescribes the need to enlist the knowledge connected with the research in a catalogue. Finally, the knowledge is packaged, stored, disseminated and the whole exercise evaluated in order to make adjustments where necessary. After necessary and sufficient knowledge is produced and thoroughly analyzed, the most appropriate body of knowledge that meet user needs are selected and preserved for use. This is what is practiced in industrial design education in Nigeria. Often, the practice is stimulated by hypothetical design task in

form of class assignment but occasionally, real design tasks from the society are addressed.

Moreover, the information considered indispensable and listed to resolving a given design task, is often reorganized in the course of implementation/translation into product. Some pieces of information might need be recoded, adjusted, reviewed, grouped, merged or synthesized. This is often the case with industrial design, particularly Graphic design tasks. An example is the logo design task for the graphic communication of the ORT Campaign in Egypt. A pretest of the media (logo) drafts resulted in target audience making a choice, which would have been neglected following the choice of the Director of the ORT campaign. The pretest necessitated a recode, adjustment, and review of the most preferred by target audience (Mothers' Favourite) that produced a reorganized successful media information that would have otherwise created undesirable outcomes (Ebigbagha, 2016 citing World Health Organization, 1987; see Plate III)

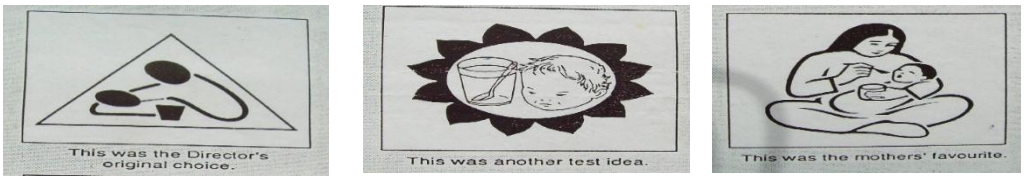


Plate III: Logos Pre-tested for the ORT Campaign in Egypt, showing how test improved logo

Beal and Meehan (1978), describe the activities and functions in reorganizing and transforming of information as Knowledge Translation, the third of six stages in the process of Knowledge Production/Utilization. They prescribed nine activities as follows: (i) Identify user needs (ii) Recode user problem (iii) Review research (iv) Synthesize/ generalize research (v) Recode generalizations (vi) Operationalize (vii) Package (viii) Disseminate; and (ix) Evaluate operations. The translation of knowledge begins with identified user need; recode user problem, and review research. These activities produce ideas which are combined into a whole that is generalize,

and re-organized to present a new knowledge. This is operationalized or organized into a set of workable and usable plan. Finally, the knowledge is packaged, distributed and the entire operation is evaluated.

The development of tangible product that satisfies user needs is a key objective for knowledge gotten and reorganized from research. The hypothetical/realistic design tasks assigned to students in industrial design education programmes usually culminates in tangible product. This could be a poster to inform, educate and communicate messages for commercial or institutional/development purposes as in graphics; it could be the simulation of consensus validated paper design on fabrics as in textiles design; it could be the production of a set of mugs for drinking as in ceramics; and it could be the production of a set of ear rings as in metal design, to mention a few examples. In tackling assignments, the user needs are presented to the learner as tasks to be resolved. This process, at early stage, involves the critical formulation of problem, mostly through inductive activities that include the review of researches conducted, and references made, which provide information, knowledge and ideas that are transformed where necessary, following identification, analysis and relation of production factors through investigation of user system and needs. These inform the solution generated in the form of draft for two-dimensional design task, and then, prototype for three-dimensional products. The invented solution is validated by teacher's approval/selection of choices from the various stages of rough options in media draft, and prototype. The draft and or prototype are pretested or subjected to test and re-test before marketable solutions are created, packaged, distributed and evaluated. However, most of the products generated for classroom learning situation do not pass through the pretest, test, re-test rigors but are evaluated. Beal and Meehan (1978), described this set of activities, functions and processes as the Product- Development stage, fourth of the six stages in Knowledge Production/Utilization process.

In the product development stage of the Knowledge-Production/Utilization process, Beal and Meehan (1978), prescribed nine

steps thus: (i) Identify user needs (ii) Formulate problems: (a) Reviewing research (b) Investigate user system; and (c) relate variables (iii) Invent solution: (a) Draft performance/ appeal specification (b) Determine general function (c) Invent/design alternative solutions (d) Analyze/assess solutions (e) Select optional solution, (f) Design prototype; and (g) Review prototype. (iv) Fabricate prototype solution (v) Test, Re-test Prototype (vi) Fabricate marketable solution (vii) Package solution (viii) Transfer to disseminators; and (ix) Evaluate operations.

So, the process of product development starts with identifying user needs, then problems are formulated through the review of research, investigation of user-system and relation of variables that lead to inventing solution. This involves drafting performance/appeal specifications, determining the general functions and inventing/designing alternative solutions. The best of these solutions are selected to make prototype that is reviewed, fabricated and to test and re-test. And marketable solutions are fabricated, packaged, transferred to disseminators and the whole operation is evaluated. This description/prescription of the creation of knowledge for the purpose of material culture development affords the practice of industrial design education in Nigeria.

Nevertheless, developed products need be distributed to users. This is occasionally done in practice because most design tasks during training in Ceramics, Graphics, Textiles, Metal, and Glass design and technology are hypothetical. However, the products of design tasks from society are distributed/disseminated to users. For example, in 1986/1987, the graphic encoding choices that constitute the Kabo Airline's Information, Education and Communication materials were distributed to the target audience. This includes transit designs, stickers, letter heads, receipts to mention a few, which were executed by the graphic encoder, a lecturer of graphic design, Hassan Balarabe, assisted by graphic design students of the Department of Industrial Design, A.B.U. Zaria. Likewise, the wayfaring signs in ABU were executed in 1988, strategies to mount these signposts/products were made, and appropriately installed following identified user needs. The whole

process was evaluated and found satisfactory. This, to a large extent, affords the Product Dissemination, fifth of six stages of the Knowledge Production/Utilization process (Beal and Meeham, 1978).

Beal and Meehan (1978), identified ten steps in the process of Product Dissemination. These are (i) Identify user needs (ii) Communicate needs to developer (iii)Assist product-development (iv) Understand solution (v) Design dissemination/distribution strategy. (vi) Communicate product messages: (a) Advertise (b) Publicize (c) Promote, (d) Demonstrate (e) Consult (f) Counsel (g) Inform; and (h) sell. (vii) Initiate distribution (viii) Adopt/Install product (ix). Monitor product performance: (a) Service (b) Repair (c) Reself; and (d) Replace; and (x) Evaluate operations. User needs are identified at the beginning for product to be distributed to where they are needed; similarly, needs should be communicated to developers where the needs are identified. Assistance during product development aid understanding of solution and planning of distribution strategy to get product to users. Also, users need to know about how the product functions, its shelf life, how best it can be preserved if not exhausted, etc. So, it is necessary to communicate product messages to users, which involves to advertise, publicize, promote, demonstrate, consult, counsel, inform and/or sell. These activities are followed by distribution and installation of product, and monitoring- which involves service, repair, and reself or replace in order to ensure that the product performance is at its optimum. Then the entire operation is evaluated.

After a product has been distributed, the decision of whether or not to start using it has to be made. This is entirely the decision of the user, and beyond the actual design of the product itself. Nevertheless, it is often deemed an integral part of Industrial Design Education, to furnish learners with the need to create products, having the users in mind. This is a major reason for the emphasis on ergonomics (a consideration of the human factor/satisfaction during product design and development). Also, it is the reason for educating learners of industrial design that products should be both functional and aesthetic in order to create awareness, stimulate

interest, occasion cognitive consolidation, and effect proselytization (McGuire, 1999). The emphasis on definition of identified user needs through satisfactory resolution of simulated/real design tasks, score on the learners, indelible mark that propels self-discipline, which is required to diagnose problem, and search, proffer, and evaluate solution. This tally with the prescribed structure of material culture development hinged on formal knowledge described as Product Adoption/Utilization, the last of six stages in the process of Knowledge Production/Utilization (Beal and Meehan, 1978).

Beal and Meehan (1978), in the stage of Product Adoption/Utilization, identified ten steps: (i) Live with current needs (ii) Discover problem (iii) Diagnose problem (iv) Search for solution (v) Evince interest in solution (vi) Try-test (vii) Adopt (or not adopt) solution (viii) Adopt/install solution (ix) Institutionalize solution; and (x) Evaluate solution: Maintain/Repair/Replace. Before the user decides to start using a product or not, he/she would have to live with the current need until it is discovered that there is a problem. This discovery is followed by evince interest whereby the user obviously search for product he/she try-test. The extent to which the product satisfies the need would determine whether or not it would be adopted. If it produces salutary effect, it would be adopted or installed. Then it starts and becomes known as an established or institutionalized solution. This is evaluated, which is necessary because through proper assessment, a solution is maintained, repaired/replaced, and further development could be evolved.

The Beal and Meehan's general model of knowledge production and utilization is an important one. It deals with the acquisition of formalized knowledge through research that is directed towards problem-solving and generation of tangible products. It aptly describes/prescribes the interrelated functions, activities and processes necessary to produce, manage and translate knowledge into tangible products as well as how products are developed, distributed and used. It underscores the centrality of knowledge as a throb for material culture growth and development.

However, not all knowledge for product development pass through research as described/prescribed by Beal and Meehan's model. For example, Africa in general and Nigeria in particular, products are developed based on knowledge produced by observation, intuition, dreams, revelation, Trial and error and leap of insight. This is triggered by the nature of the problem encountered, experience of the developer/user, and disposition of individuals toward problem solving. Also, factors that influence knowledge production, aptitude and practice of a people, such as climatic conditions, physical features: river, desert and vegetation are not considered. These conditions impose different but peculiar challenges on a people that often necessitate rapid and different response to produce knowledge and develop product that satisfactorily resolve needs (Ebigbagha, 2016).

Nevertheless, the Beal and Meehan's model of knowledge production and utilization is to a large extent, useful for the kind of knowledge that is produced in industrial design education - knowledge needed to develop products hinged on identified user need and could be mass produced by industrial methods.

From all we have discussed, we could see that furnishing citizens who are predominantly unemployed with industrial design education, equips them with knowledge and capacities to translate knowledge into products of value. This establishes them in productive acts that affords sustainable development and wealth at national and global levels. However, industrial design education is faced with critical challenges that are highlighted hereunder.

Challenges in Industrial Design Education

Challenges in industrial design education are many. This includes adopting obsolete Arts education mode chiefly characterized by intuitiveness, reluctance to follow dynamic changes that are shaping industrial world and insufficient collaboration of educators with manufacturers of industrial design products.

Often, hypothetical assignments given to learners of industrial design education mimics real life design tasks but are from figment of imagination, and intuition of teachers. This affords perpetuation of obsolete arts and craft education mode, which is characterized by prevalent intuitiveness (Xi, 2008). According to Kolko (2005), there seems reluctance in design education to moving beyond basic aesthetics and 'form giving'. Furthermore, he states that emphasis on rendering, model making or styling, which is the focus in the academia should be oriented to business development and user-centered process because industrial designers are now required to be actively involved in strategic planning, innovative product development and interdisciplinary collaboration. However, the related activities, processes and functions in the process of product development are more or less tedious than they are in reality. For example, were the posters for the Delayed Sexual Debut Campaign (in plate II) hypothetical, the Creative Brief, which was anchored on the findings of the National Reproductive Health Survey - NARHS, a preliminary research conducted, on the target audience may not have been done(SFH, 2006). A fictional scene of similar features could have been formulated to constitute the basis for the design task of the poster.

Likewise, is the extent of interrelationship and collaboration that exist between hypothetical and real design task. Given the example of poster just mentioned above, the complex and high level of collaboration between the graphic encoders, JWC & LT Limited, Lagos, and the media team of the media requesting agency, SFH Abuja, in reality, would not likely be the same if it were to be hypothetical. This is particularly so, in the stages of Clarification of Source's aim/target audience, and pretesting of the media draft during the media development process. While the clarification, and validation/approval of the media draft is often solely determined by the teacher in hypothetical learners' situation, it is a media teamwork in real situation that involves the Source, Graphic Encoder/other members of a given media team, and other stakeholders including the Target audience. In hypothetical situations, the crucial stage of pretesting media draft with

target audience in order to make reviews (if necessary) is usually neglected but not often taken for granted in real situations by any Source that purports to achieve desired outcomes, as in the Sexual Delayed Debut campaign (Ebigbagha, 2016).

The reluctance to follow dynamic changes that are shaping industrial world, is an important challenge facing industrial design education in Nigeria. Art and design equipment, tools and materials for design and reproduction are often changing and improved upon as a result of increasing knowledge. So, staff need be frequently developed to be conversant with new equipment, tools and materials in order not to inflict learners with practice, ideas, and knowledge that are obsolete in the out-of-school world. This would enable both learners and teachers to be abreast with machines and material manipulations in industrial settings and adapt their designs to fit production by industrial methods. However, most institutions where industrial design education are taught in Nigeria, funding staff development to update knowledge on technological innovations is a rarity.

Another critical challenge confronting industrial design education, is inadequate link and collaboration in problem-solving between institutions, where industrial design education operates, and the industries where industrial design products are mass produced. As observed, design should be a part of market-driven massification trend, so, it requires collaboration instead of been often occasioned in solitary pursuit as it is presently, whereby interaction is based on one-to-one faculty-student relationship, which is a challenge currently facing design education (Scott, 1998).

The above, requires dynamic design education curriculum hinged on diligent, calculated learning outcomes with focus on human centered design, marketing and good management expertise. This would assist industrial design educators to minimize giving tasks to learners on hypothetical basis and intuitiveness, which would maximize tasks

anchored on real situations that meet manufacturers/users specification and needs.

In order to satisfactorily resolve the aforementioned challenges, it is suggested that a consensus within the design education community should be established, so that students are more involved in active learning that enables a to-and-fro movement from generic to specialist and from abstract to concrete modes of working (Liem, 2014). In addition, he suggests that "Comprehensive and collaborative studio projects should be implemented as platforms, where social, interdisciplinary and inquiry-based learning can be developed in line with selected design themes, processes and methods". Therefore, focus on human centered design through collaboration of educators, industrial designers, manufacturers and the public would produce the needed salutary effect.

Conclusion

Economic recovery in Nigeria requires a critical paradigm shift from a culture of predominant consumption and gross dependence on importation, to a culture of persistent productivity, self-reliance and significantly high level of exportation. Towards this end, industrial design education is pivotal for success.

Industrial design education equips the individual with prerequisite know-how to transform resources at primary state into finished products from informed standpoint of view to meet user specifications/needs at local and global levels. Usually, when design knowledge and productivity are combined with developed technological base, good management expertise, and readiness, it results in economic buoyancy that is sustainable as it is in Japan, Taiwan, Korea, Hong Kong, and China, for examples. Therefore, a massive engagement of individuals in industrial design education would affirmatively increase design capabilities, management expertise, material productivity, and leapfrog the ailing economy of Nigeria.

Nevertheless, challenges in industrial design education, could be satisfactorily resolved through responsive staff development that avails teachers current design knowledge, and collaboration of educators,

industrial designers, manufacturers and other stakeholders in design problem-solving.

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