

# **Industrial Design at the University of Botswana: Designing Designers as if Botswana's Setting Matters**

Samuel Khumomotse  
Lecturer (Design & Technology)  
Faculty of Engineering & Technology  
University of Botswana  
P/Bag 0061, Gaborone, Botswana  
Tel: (267)355 4316 Fax: (267) 352 309, Email: Khumosm@mopipi.ub.bw

## **Abstract**

The University of Botswana is proposing to introduce an undergraduate degree program in Industrial Design. It is inevitable that a new program must have local relevance while not losing touch with the global realities. This paper discusses the need for the course, the proposed program structure and its rationale within Botswana's social, economic and industrial setting. The submission discusses global factors that were considered in designing the program. It also highlights the implementation plan in terms of student enrolment and their exits profile, staff, resources both existing and projected, and industry collaboration. The article would be of use to policy makers, Industrial Design academics and design professionals who would like to understand how to design new courses in context. The paper arrives at an inevitable conclusion that the aim of the program is to produce designers who will operate efficiently within Botswana's peculiar environment. (140)

## **Keywords**

Industrial Design  
Design Education  
Industrial Design Curriculum  
Design Education Context  
Botswana Industrial Design

## **Bibliographic Note**

Samuel Khumomotse, B.Ed (D&T) is a Lecturer in Design & Technology at the University of Botswana and coordinator of the proposed undergraduate Industrial Design programme. He holds a Master of Design Degree from the University of Technology Sydney, Australia and a Bachelor of Education in Design and Technology from the University of Botswana. Professional experience includes appointment as a teacher of Design and Technology in Secondary School and a Staff Development Fellow (SDF) at the Department of Technology and Educational Studies at the University of Botswana. He has been teaching Bachelor of Education Design and Technology Students since 1997. Principal research interests areas are: Industrial Design, the use of Information Technology in Design, product development, product design methods, product design environment, sustainable product design, social responsibility in design, design and the social economy, universal design, psychological dimensions of design, design policy and design education in developing countries. (150 Words)

## **Introduction**

After rigorous research and consultation the University of Botswana resolved to develop an undergraduate programme in Industrial Design to be known as Bachelor of Design (B.Des) in Industrial Design. The department of Technology and Educational Studies, which is one of the four constituent departments of the Faculty of Engineering and Technology, will offer the proposed programme parallel with revised B.Des Design and Technology Education. To date the programme has been approved by a number of university structures and is currently awaiting a review by a consultant. Once the programme has been reviewed and approved by the consultant and the rest of the university structures it is planned for implementation by August 2002.

Whereas many may applaud the University of Botswana developing a programme, which highly relevant to the country's needs and that of the region, it must be noted that such a task was not easy. Firstly the programme had to be designed within Botswana's context. Secondly the programme had to take into consideration global factors that affect design. The student programme structure, courses, intake, staffing, resources, industry-collaboration are also discussed in this paper.

## **Botswana Context**

Designing a new programme can be effectively done after analysing the environment that prevails within the country, which will be the ultimate benefactor. Notable factors that form Botswana's context include economic, technological, social, political and education.

## **Industrial and Economic Setting**

Botswana is industrialising at a fast pace; in fact it is said to be one of the fastest growing economies in the world. Over 70% of commodities in Botswana are imported, mostly from South Africa. Botswana are not an entrepreneurial society but they believe in job seeking than job creation. Consequently, the government of Botswana has just set up Citizen Entrepreneurship Development Agency (CEDA) to fund citizen start up businesses. In addition Botswana is reliant on diamonds, which are the government's main revenue earner. Currently the government is trying to implement an economic diversification policy to guard against this dangerous situation.

## **Technological Setting**

Botswana has leaped forward with technology in Africa as its telecommunication system is regarded to be the one of the best in Africa. The Internet is not a myth but is a reality while email has been used for some years now. At the same time computer literacy is skyrocketing. Government secondary schools on the other hand have introduced computer awareness subject to equip students with computer skills for higher education and the workplace.

## **Social Setting**

Botswana has a population of over 1.5 million, of whom 75% live in rural areas while the remaining 25% live in urban centres. Botswana have a dynamic culture, which is characterised by the quest for novelty and consumption patterns not much different from those of the West.

## **Political Setting**

Botswana is renown for peace and tranquility that reigns supreme, whereas most African states are ravaged by unending civil strife, wars, bad governance and wide spread naked corruption. Such a political environment could enable Botswana to export education by way of admitting

international students who will be assured of finishing their studies in time. Furthermore with a capitalist system in place design is poised to flourish because; *“Design without capitalism is like a car without an engine-it goes nowhere”* (Heller 1992), whereas design with capitalism is like a car with an engine it goes somewhere.

### **Educational Setting and State of Industrial Design**

The University of Botswana is the only university in the country followed by a number of colleges, government and privately owned. In the whole country there is no institution that offers a programme at any level in Industrial Design. Within the Southern African Development Community (SADC) region, which is composed of 14 member states there are only three known institutions (though not universities) that offer Industrial Design. In the whole of Africa the only university known to offer studies in Industrial Design, is the University of Nairobi in Kenya. So far there is only one known Botswana Industrial Designer who obtained his qualification from North America about two years. As of now there are no Industrial Design consultancies or freelancers in the country. Quite recently the government started sending students for undergraduate studies in Industrial Design abroad though the first batch has not yet graduated.

### **Global Context**

Global realities cannot be ignored in designing a programme of study, more so in a globalised world of today. In line with this Balcioglu (1998) highlights that the role of product design in the post-industrial society needs to be reassessed and questioned. Margolin (1998) identifies the fact that the world is suffering from a structural problem and that design must play a significant role in enabling the world to attain an equilibrium model. Manzini (1998) proposes a new way of rethinking product design for the information and sustainable society. He advocates change of consumption patterns rather than new design methods but proposes new types of products in the period of transition. Rams (1998) argue for new responsibility for industrial design so as to contribute to social and ecological sustainability. At the same time Woudhuysen (1998) brings to light the fact that a globalised economy is a challenge to designers. In addition, Papanek, the most outstanding 20<sup>th</sup> century advocate of ‘Responsible Design’ emphasised the need for designers to respond to massive amounts of new knowledge from other fields about human responses to technological environments. It was perhaps in recognition of these imperatives that Baxter (1995:4) stated that the Industrial Designer of the future must be:

- multi-skilled,
- fanatically customer oriented,
- deeply committed to systematic design methods,
- knowledgeable about a wide range of manufacturing business,
- comfortable in marketing, design and engineering disciplines
- accomplished at creative problem solving

In case that some might be tempted to dismiss the above facts as mere ‘rhetoric’ devoid of substance, Thackara (1997) points out that the winners of the European Design Prize had successfully mapped these imperatives, resulting in being more innovative. Industrial Design programmes therefore, must be responsive to this macro-environment to be worthwhile.

## **Need Assessment**

A preliminary need assessment survey was conducted on stakeholders, which included manufacturing and service industry before designing the programme. Responses were received from all and 100% of the industries agreed that the department should offer such a programme. Perhaps the most interesting response was the one received from Department of Student Placement and Welfare stating categorically that the government of Botswana will sponsor 'all' student admitted into the programme.

## **Programme Goal**

Based on the compelling factors articulated above the goal of the Bachelor of Design Industrial Design at the University of Botswana is to produce graduates who will be:

*Multi-skilled, innovative, entrepreneurial, conversant with the design of form and function of a product or system, able to transverse with ease between design, engineering, manufacturing and business functions, and have an appreciation of social and economic problems facing Botswana and contribute significantly to the posterity and livelihood of Batswana and the region.*

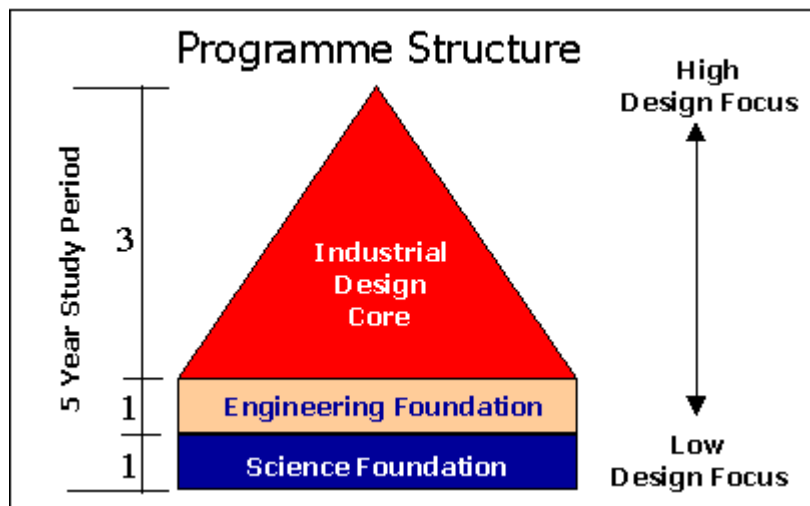
## **Programme Objectives**

The Programme of Study leading to the B. Des. (Industrial Design) Degree proposed to be offered aims at producing prospective Industrial Designers to take up careers in industry and for self-employment. The exit profile of a graduate would include the following competence:

- Conceive, plan and design need-based products with due regard to industrial materials and manufacturing processes for mass production.
- Conduct feasibility studies for product development and research on creative solutions
- Demonstrate and improve the design by making and evaluating the artifacts jointly with engineering and technical staff.
- Conduct detailed design of systems and subsystems with due regard to established design principles and product architecture
- Incorporate design features to conform to specified quality standards and safety requirements.
- Prepare manufacturing designs with tolerances and guidelines for production

## **Programme Structure**

The B.Des programme is five years long including the first year, which is spent at the Faculty of Sciences. The programme is composed of one year Science Foundation, followed by one year of Engineering Foundation and three years of Industrial Design as indicated in figure 1 below.



**Figure 1: Industrial Design Programme Structure**

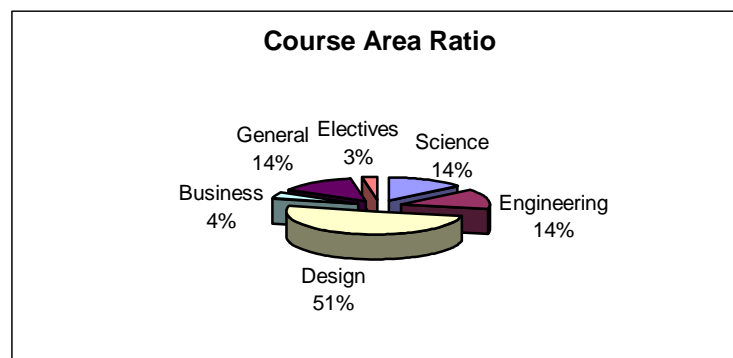
### Science and Engineering Foundation

Many Industrial Design programmes around the world have a bias to fine art particularly in North America. However, there are some also which have a bias to science and engineering. There are few institutions, which have tried to balance between the art and science of Industrial Design. Based on the programme philosophy the proposed programme has a balance of science and art, i.e. the technical and the form aspect of designing products.

The science and engineering foundation will ground prospective designers on scientific and technical principles they are will apply in their daily practice. Most products are an embodiment of science and technology hence designers must have the skills of designing the product performance. The last three years of study will by far be adequate to produce competent Industrial Designers, for Botswana's industry and job market.

### Programme Course Composition

Evident in figure 2 is that Industrial Design at the University of Botswana will be a blend of Science, Engineering, Design, Business, General Education and Electives.



**Figure 2: Course Ratio by Area of Study**

### Course Types Ratio

In accordance with the University wide policy of semesterisation policy B.Des, Industrial Design programme will have the following types of courses: core, optional, general education and electives as illustrated in figure 3.

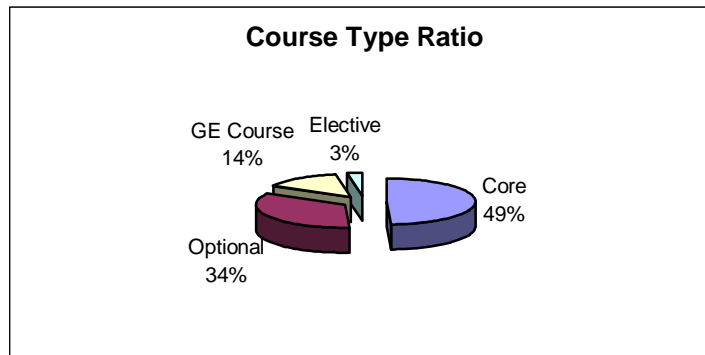


Figure 3: Course Type Ratio

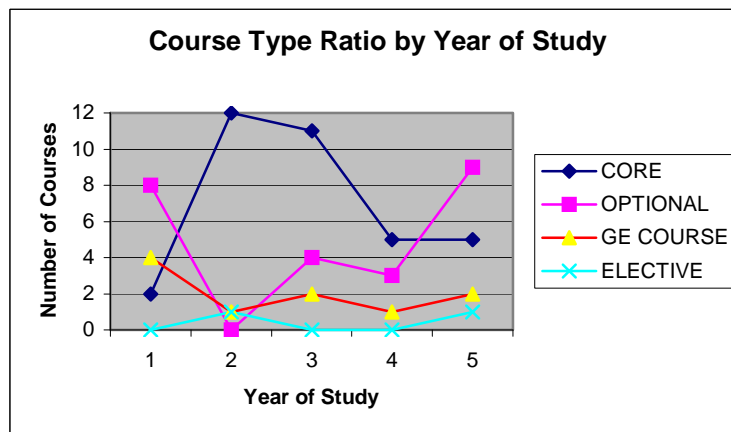
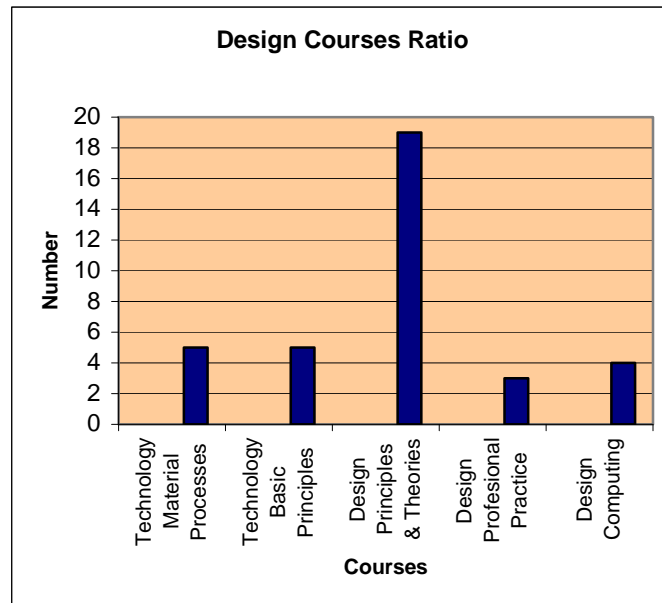


Figure 4: Course Type Ratio by Year of Study

The programme is designed to be flexible to give students the freedom and liberty to combine subject according to their taste. Figure 4 shows core courses being few in the first year, then rising up sharply in the second year and slowly dropping down towards the final year. Optional courses, which were many in the first year dropped down in the second year and increase gradually up the 5<sup>th</sup> year of study to facilitate flexibility and freedom of choice. General education courses and electives are almost constant throughout the five years of study being kept to the lowest numbers.

### Design Courses Composition

The design aspect of the programme is composed of the following course areas: Technology: Material Processes, Technology: Basic Principles, Design: Principles and Theories, Design: Professional Practice, Design: Design Computing. According to figure 5 design principles and theories take makes a big portion of the design courses while the other components are almost the same. The rationale for having various design components is provided below.



**Figure 5: The Design Courses Composition**

#### **Technology: Material Processes & Basic Principles**

Technology such as Pneumatics, Hydraulics, and Electronics are applied in products designed by Industrial Designers. These basic technology principles will be conducted in specialised laboratories equipped with specialised systems. On the other hand practical hand-on skills are indispensable because for an Industrial Designer to be rational in designing he/she must be familiar with; how materials behave, methods of manipulating various materials, limitations of materials, tools and machinery used on materials.

#### **Design: Principles & Theory, Professional Practice and Design Computing**

There is no way a designer can be successful without a deep understanding of design principles and theory. An insight into design methods, design thinking, creativity, innovation, customer needs analysis, form and function issues will develop the much needed designerly skills. Design Research become yet a pertinent course in this category as it will open students' minds to the role of research in the design process. A designer with cutting-edge design skills will emerge victorious in the turbulent product design environment. Courses such as Design Management would prepare the student for functioning effectively as professional while design computing courses will equip prospective designers with the much needed computer skills.

#### **Business, General and Elective Courses**

Business courses such Entrepreneurship Studies are seen to be crucial especially as has already been stated that Batswana in general are not business minded. Industrial Designers in particular could make a significant contribution to economic diversification and job creation by setting up their own business and creating companies that will have new markets. The general education courses and enable students study some general faculty courses of their choice, while electives can be taken from any course and faculty.

## **Industrial Training and Industry Collaboration**

This exercise meant to familiarise students with the dynamics and realities of the world of work and will be undertaken in a period of six months during the fourth year of study. Departmental staff in collaboration with industry will closely monitor this exercise. With the introduction of Industrial Design the links with industry will have to be strengthened. The department intends to form close ties with design bodies in the region and around the world so as to enhance its expertise.

## **Resources: Current Situation**

At the moment the department has facilities equipped with machinery, tools and equipment, which are used for the current Design and Technology programme. Available resources are as follows:

- One miscellaneous material-processing workshop with wood, metal, plastics and ceramics machinery and basic material manipulation tools.
- One workshop with wood equipment and machinery only
- One plastics processing workshop with vacuum forming, and Boxford thermoforming centre which performs up to six different plastic processes such as injection moulding, blow moulding etc.
- A CAD/CAM facility with a semi-industrial CNC machines
- A graphic design studio with basic graphics equipment
- A technology lab with electronics and specialised software including AutoCAD
- A staff resources room with workstations loaded with specialised software
- A closed circuit television room with video cameras and video editing equipment
- The new university library has about 200 workstation to be used by faculty students and it is planned that specialised design software will be installed soon.
- A number of classrooms some of which are equipped with the state-of-the-art presentation equipment

In addition to all the above the department of Mechanical Engineering has manufacturing lab with industrial CNC machinery which are accessible the department. Furthermore, all staff member have computers in their offices with software such as AutoCAD.

## **Projected Facilities and Resources**

The department will have new facilities when the faculty of Engineering and Technology relocates to a new site at the main university campus. Although the facilities are still in the design stage they are planned for construction early 2002. Apart from staff offices and meeting rooms and postgraduate student offices light laboratories will include: Industrial Design Laboratory, Leather, Upholstery and Taxidermy Laboratory, Computer Aided Design Laboratory, Mechatronics Laboratory, Two Design Studios, Ergonomics & Human Factors Laboratory, Postgraduate Research Laboratory, School Teaching Software Development Laboratory, Educational Technology Lab and a Departmental Gallery. Workshops include; Plastics Fabrication Workshop, Product Development Workshops, Power Machines Workshops, Wood Workshop, Metal Workshop, Ceramics and Glass Workshop.

## **Current Staffing Situation**

There is eight teaching staff in the department and there are some efforts of filling the four remaining positions. Since the new programme will be running parallel with an already existing programme with common subject between them it is believed that the current staff have the experience to teach in the new programme. The proposed programme has an establishment of two senior positions of senior lecturer and associate professor, which will be filled once it has been approved. More staff will be recruited as the intake and demand grows.

## **Entry Requirements and Student Intake**

The entry requirement for the programme at the first year will be the same as that for the programme in Design and Technology. At present, a student needs to have passed O levels with credits in Mathematics, English and a Science based subject or Technical subject. It is proposed to permit the Diploma holders in Industrial Design from other institutions to join at an appropriate level.

The department will take student numbers commensurate with resource on ground and a figure of 20 is perceived to be adequate for a start. The intake will increase according to the job market demand as well as increase with resources. As of now the course is design to be both pre-service and in-service programme.

## **Conclusion**

The introduction of Industrial Design at the university of Botswana is a timely step if not long overdue. Industrial Design will contribute to industrialisation, economic diversification and creation of markets for Botswana. The programme was designed with Botswana's context in mind while not ignoring global realities of the modern world. 'Cutting and pasting' a curriculum from one setting to another without considering the local setting is what the University of Botswana has avoided at all costs in the development of this new programme of study. Otherwise such a programme would not justify its own introduction as much as the university would not justify its own existence. The department has expertise, resources and structures to run an Industrial Design programme as any comparable institution around the world. The proposed programme will hopefully produce designers who will operate successfully within Botswana, the region and in a globalised society whose most prominent feature is rapid change. By introducing this unique programme the University of Botswana is trying to design designers as if Botswana's setting matters. (2821 Words)

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