PRE-VOCATIONAL SECONDARY EDUCATION IN BOTSWANA

AN HISTORICAL AND COMPARATIVE PERSPECTIVE — 1966 TO 2002

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Abstract

As populations grow, and the number of students attending secondary schools escalates, the need for relevant and appropriate courses for students who finish 12 years of education, but are unable to continue to any tertiary institution, becomes perceived as being more urgent.

Botswana, combining political stability and democracy since independence in 1966, has been an example of planned and sustained growth to the rest of Africa. Yet Botswana has resisted the full vocationalization of its secondary schools. In 1992 only 6,400 students took the Cambridge Overseas School certificate. Except for Agriculture, which 45 percent of the students took, the other nine practical subjects were taken by from 814 to only 14 students each.

The senior secondary school system has grown immensely. The number of students in Forms Four and Five had in 2001 grown by 2.68 times; while participation in the ten key practical subjects had increased from 2.98 to 39 times since 1992 depending on the subject. Sixty-five percent of the Form Five students were now taking Agriculture. Commerce, Design and Technology, Art and Food and Nutrition had all expanded significantly. The number of teachers nearly doubled during these years; but for practical subjects the increase was more dramatic and was coupled with extensive training and localization. Over 23,000 students took the new Botswana General Certificate of Secondary Education (BGCSE) in 2001 of whom 16,500 were in the nation’s 27 Government senior secondary schools. The University of Botswana was able to enroll approximately 3,400 of these in August 2002 or only fifteen percent.

What is the place of practical subjects in Botswana’s secondary schools today? It might be assumed that as the proportion of students who can continue their education to the next level declines the demand for practical subjects and vocational related education will increase. What has actually happened? What subjects are being taken in the new millennium in the schools and with what results?

This paper examines the literature on vocationalization and assesses the status of practical subjects, issues of assessment, school organization, staffing, the high cost of vocationalization, poor guidance and counselling and the absence of support systems for vocational graduates.

Is Botswana continuing to be successful in preparing the school leaver for the world of work? What are the lessons to be learned from Botswana?
Vocationalization—Definition
The term vocationalization refers to efforts by schools to include in their curriculum those practical subjects which are likely to generate among students some basic knowledge, skills and dispositions that might prepare them to think of becoming skilled workers or to enter manual operations. The inclusion of practical or industrial arts subjects especially in the curriculum of secondary schools as part of a programme of general education is considered an essential element in the vocationalization of education. (Bacchus, 1988: 31)

Introduction
This paper explores the history of the development of secondary education in Botswana in the context of the policy issues related to vocationalization and in a comparative context. Its focus is on the place of practical subjects in senior secondary schools and in the context of development and change in Botswana.

A number of key issues will be examined: the popularity and availability of practical subjects; changes in policy over the years; the reliance on performance in practical subjects as a criteria for admission into tertiary institutions; and the impact of rapid expansion on practical subjects.

For the purpose of this paper the ten key practical subjects are: Agriculture; the subjects of Commerce, Principles of Accounts and Business Studies; Design and Technology; Computer Studies; the Home Economics subjects of Food and Nutrition, Fashion and Fabrics and Home Management; and Art (now Art and Design). Though most senior secondary schools have a division of practical subjects, they may organize them differently from school to school. Commerce may be grouped with the “Humanities and Social Science” or the core subject of English and the related subjects of Literature, History, Development Studies, Cultural Studies, Geography, Environmental Studies, Religious Education and Setswana. Computer Studies is usually grouped with the “Sciences”—Mathematics, Additional Maths, single science, double science, triple science (more commonly called Pure Science as students take Chemistry, Physics and Biology). Agriculture is also often perceived as a science subject. It will be demonstrated that the hierarchy of subjects in the secondary schools has a profound impact both on practical subjects and the future careers of students.

Background to Botswana
Botswana is an independent republic in Southern Africa that achieved its independence in 1966. It is landlocked, contains 582,000 square kilometres, but its population density in 2002 is only 2.92 people per square kilometre for 1,700,000 people. Urbanization was rated at 45 percent. At independence Botswana was estimated to have 450,000 people, the majority living in rural and remote areas or in small agro-towns (headquarters of the various Tswana chiefdoms). By the census in 2001, 22 percent of the population was living in urban areas and 23 percent in the ten main agro-towns. The major growth areas have evolved around mines (Jwaneng, Lethakeng and Orapa, Sowa Pan and Selbi-Phikwe), the town of Lobatse, the city of Francistown and the
capital Gaborone. Some of the traditional villages near these major centres have grown up to ten fold every decade. Botswana is said to have the fastest growing urban areas in Africa.

At independence Botswana was one of the poorest countries in the world. Its wealth resided in livestock and limited potential for tourism. Then in the early 1970s diamonds were discovered. These have provided the foundation for rapid growth ever since. General political stability and freedom from corruption has facilitated sustained development. Until 1994 Botswana was one of the “Front-line States” opposed to Apartheid in South Africa. Growth, fuelled by government spending, has occurred in most sectors of life, including education.

In 1966 there were 1,531 students in secondary schools. By 2002 Botswana had achieved an enrolment in Forms One to Five of 153,593 students. Botswana’s population in 36 years expanded 3.8 times, while its secondary school enrolment increased 100 times! This is a good indication of how rapid social change and development has been in Botswana.

Secondary Education

The objective of secondary schooling has been to provide an educated populace capable of both entering further education and/or joining the labour force as workers sufficiently qualified as to benefit from further training on the job.

Secondary education follows seven years of primary schooling. Forms One to Five were first offered in five-year secondary schools. With the introduction of community junior secondary schools in the mid-1980s Forms One and Two were taught there (providing nine years of basic education) and the senior schools taught Forms Three to Five. Following the second National Commission on Education in 1993 and the Government White Paper in 1994 on a Revised National Policy on Education (Botswana, 1993; 1994), Form Three has been moved to the junior secondary schools and the senior schools have been able to increase their enrolments by 1/3rd. This change has also eliminated what was perceived as a wasted year of “shopping around” in Form Three (where students were allowed to experience a variety of subjects before selecting their course of study for Forms Four and Five). It also reduced the per student costs as junior secondary schools are cheaper to run than senior secondary schools, particularly in the main practical subjects of Agriculture, Art, Home Economics, Design and Technology and Business Studies. In the junior schools, if Computer Awareness is taught, it is not examined (by June 2002 only 51 of 206 junior schools had received their computers and not all of these had teachers for the subject).

Continuity between junior and senior secondary school cannot really be achieved because approximately 20 examinable subjects are offered in Forms Four and Five (students are normally examined on seven to nine of them). In the junior schools only nine subjects are examined at the end of Form Three on the Junior Certificate, but there are theoretically up to 15 subjects available (not all schools have the staff to teach all the optional subjects). The students in Forms One must take as core subjects English, Mathematics, Integrated Science, Setswana, Social Studies and Agriculture. The optional subjects divide into “General” subjects where
students may select between Moral or Religious Education, Physical Education and Music and Practical Subjects where the choice is between Business Studies, Home Economics, Design and Technology, Art and Physical Education (not all general and practical subjects are offered in some schools). As noted above students in junior schools may also take Computer Awareness (if available), but are not examined in it. Business Studies in Form One divides into Commerce and Office Procedures and Commerce and Bookkeeping/Accounts in Forms Two and Three. A pattern is emerging that students who have taken a practical subject in junior school prefer not to continue it in senior school, instead wanting to learn something new, perhaps because they have found the subject difficult, or not been challenged by it (Art, if enjoyed, could be the exception to this). The implications of this will be considered below.

In the senior schools the syllabus allows for up to ten practical subjects to be offered. These are: Agriculture; Design and Technology (with the separate subjects of Woodwork, Metalwork and Electronics phased out in the mid-1990s); three separate subjects under Home Economics—Food and Nutrition, Fashion and Fabrics and Home Management; Art, which became Art and Design in 2001; Computer Studies; and three Commerce subjects—Principles of Accounts, Commerce and in 1999 the new subject of Business Studies was introduced. Of these ten practical subjects only five (Agriculture, Design and Technology, Commerce, Food and Nutrition and Art and Design) are currently taught at all senior secondary schools. The major constraint in the provision of the other five subjects at the school level is a combination of limited facilities and a shortage of teachers to teach the subjects.

Senior secondary school students are divided into three groups. This streaming has a significant impact on what students take practical subjects and their success in those subjects. How streaming is carried out differs from school to school. Students are streamed in Form Four according to their preferences and their performance on the Junior Certificate. The best students are streamed into Pure or Triple Science (15 percent of the Form Fives in 2001); the next best into Double Science and the weakest students into Single Science (54 percent in 2001). Students doing Pure Science usually are not able to take any practical subject, but when their programme or an “overload” allows it, they usually excel in that subject (Mater Spei school is an example of this).

The Pure Science stream also tends to do better in English and Mathematics. While six percent of the Form Fives failed (F, G, or U) English on the BGCSE in 2001, only 25 percent achieved a Credit or better (C to A*). The failure rate in Mathematics in 2001 was a disturbing 42 percent, but 25 percent earned a Credit. Mathematics is the Achilles Heel of the whole system. Students who cannot do well in Mathematics also tend to have trouble with subjects like Principles of Accounts.

With the introduction of Botswana’s own General Certificate of Secondary Education (BGCSE) there has been a major reform of the syllabus across all subjects with the introduction of individual research projects (like in Design and Technology). An example of this is the change in Art to become Art and Design, with a ten-hour examination and a different approach to the portfolio requiring more research and problem solving on the part of each student. This approach has been refined and introduced into all practical subjects, for example in Food and Nutrition in
2000, Fashion and Fabrics in 2001 and Home Management in 2002 (though in Commerce students can still take an examination paper instead of doing a project). Where as in the past continuous assessment in practical subjects counted for approximately 20 percent of the Cambridge result, under the new BGCSE it represents half the final mark.

**Developments since Independence**

*Education has achieved the highest rates of expansion of any government service since Independence. Major changes have come fast, and the sector is still evolving rapidly. The accomplishments have been dramatic, and at the same time the problems have been monumental. There is probably no other Government sector from which the public expects and demands more, and no other sector for which the rapid rate of population growth poses larger problems. (Botswana, 1988: 89)*

In 1976 there were 15 aided and 17 private secondary schools. Following the high priority given to establishing the Government community junior secondary schools, most private junior schools were absorbed. In 1991 there were 146 community junior secondary schools and 23 senior secondary schools with 48,572 students in the community junior secondary schools and 19,595 in the senior secondary schools. There was space for only 31 percent of the 1991 Form Two leavers in senior secondary schools in 1992.

By 2002 the transition rate between Form Three and Form Four was 50.8 percent (35,761 students in Form Three in 2001 and 18,177 in Form Four in 2002). The proportion of unqualified teachers in the secondary schools had started to go down, but because of rapid expansion these second level institutions still rely on untrained or temporary staff to fill vacancies as teachers.

Table 1 is about the Government (and grant-aided) sector of education. There is in 2002 a thriving private sector. The rapid growth and expanded output of junior secondary schools has caused a demand for places in Form Four. In 2002 there are 51 private senior secondary schools in Botswana. Botswana has 43 Brigades; they also provide further vocational training to junior secondary school leavers, but their capacity cannot meet the demand. In 2002 there are 70 registered private vocational training centres in Botswana. For an earlier study of private vocational training see Weeks, et.al. (1997).

**Commissions 1977 and 1993**

*Before Independence Botswana had an 83-2 structure. This was changed to 7-3-2 on the eve of Independence, presumably to reduce the cost of primary education. During the transition year Standard 5 and 6 pupils were promoted to Standard 7. The 7-3-2 structure was changed to 7-2-3 in 1986 as an interim step to a 6-3-3 structure following the recommendations of Education for Kagisano. (Mautle and Weeks, 1993)*

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**Table 1:** Development of Secondary Education in Botswana: 1966 to 2002
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>POPULATION (.000)*</td>
<td>450</td>
<td>712</td>
<td>1 131</td>
<td>1 357</td>
<td>1 700</td>
</tr>
<tr>
<td>SECONDARY (Jr&amp;Sr) Form 1-5 Schools**</td>
<td>-</td>
<td>32</td>
<td>73</td>
<td>169</td>
<td>233</td>
</tr>
<tr>
<td>Enrolment</td>
<td>1,531</td>
<td>13,991</td>
<td>35,966</td>
<td>67,167</td>
<td>153,593</td>
</tr>
<tr>
<td>Teachers</td>
<td>-</td>
<td>664</td>
<td>1,619</td>
<td>3,516</td>
<td>6,856</td>
</tr>
<tr>
<td>Teacher:Student Ratio</td>
<td>1:21.0</td>
<td>1:22.2</td>
<td>1:19.1</td>
<td>1:22.5</td>
<td></td>
</tr>
<tr>
<td>Untrained ***</td>
<td>-</td>
<td>29%</td>
<td>26%</td>
<td>13%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Sources:  
1966 Education for Kagisano, *op.cit.*  
2002 Figures from Teaching Management Services, Ministry of Education.  
** In 1991 this included 23 senior schools; in 2002, 27 senior schools.  
*** In 2002 there were 1,099 “temporary teachers” in secondary schools.

The Policy Framework

The development of secondary education in Botswana has occurred within the context of six-year rolling plans (called National Development Plans or NDP). The current plan, NDP8, ends in 2003. These plans have been guided by key educational policy frameworks established by National Commissions on Education followed by White Papers on National Policy on Education. The first National Commission on Education was held in 1977 and the second in 1993, and the Revised National Policy on Education was approved by the Government in 1994 (Botswana, 1977; 1993; 1994).

1977 and 1979—first National Commission Education

In 1977 the structure of the education system was seven years primary, three years junior secondary and two years senior secondary followed by four years of university education (7+3+2+4). The 1977 commission wished to raise basic education from seven to nine years and establish a 7+2+3 system leading to 6+3+3). In 1985 the Government began implementing improved access to Form One and by 1988 Form Three was transferred to the senior schools; there were then 23 (Government and Government-aided). The 1977 commission reiterated that “The purpose of the schools at all levels will be to prepare children for useful, productive life in
the real world. They should have the basic skills of literacy, numeracy and the knowledge that will make them self-reliant later in life, whether they continue full-time schooling, study on their own, find employment, or become self-employed" (Botswana, 1977:3). There was a “Supplementary Report of the National Commission in Education” (Botswana, 1979; Weeks, 1993). It favoured a three-year junior secondary on the grounds that two years was too short to achieve its objectives.

The first Commission recommended that in senior schools students should not take more than one practical subject. They believed that to take more than one practical subject might disadvantage a student when it came to tertiary selection. Practical subjects were offered as “options”. The exception to one practical subject took place at Lobatse Senior Secondary School where a “Technical Wing” was developed and students were fully “vocationalized” and might take up to four practical subjects (Weeks, 1997).

1993 and 1994—second National Commission on Education

The second Commission and the Revised National Policy on Education (RNPE) re-affirmed the need to return to the 7+3+2 structure for the system. The second Term of Reference (out of seven) called for the Commission to “re-examine the structure of the education system and recommend a system that will guarantee universal access to basic education, whilst consolidating vocationalising the curriculum content at this level” and in Terms of Reference number four specifically called for the Commission to “study the various possible methods of student streaming into vocational and academic groups at senior secondary level” (Botswana, 1993:v).

The second Commission (NCE) responding to the critique that the secondary schools are not doing enough to vocationalize, that they are too academic, comments:

*However, in terms of international trends it could be said that Botswana enjoys the advantage of having a senior secondary curriculum which may be regarded as contemporary among middle-income developing countries as it has not suffered from misdirected “vocationalization” efforts. The trend among middle-income countries is that emphasis should be placed on cognitive development, language, Mathematics and Science at the secondary level. Training for employment should begin after education. Botswana is therefore correctly aligned in concentrating on the academic disciplines. At the same time the key workplace-related subjects like Commerce and Design and Technology are being introduced* [my emphasis] (Botswana, 1993:172).

The NCE Recommendation 32 was (Weeks, 1995:87)

**Junior Certificate Curriculum**: six core subjects (English, Setswana, social studies, mathematics, integrated science, design and technology); computer awareness; between two and four optional subjects drawn from practical studies (home economics, agriculture, commerce, principles of accounts, office skills) and general studies (development studies, religious and moral education, art, music, physical education and a third language); one co-curricular activity (clubs or sport); the Department of Curriculum Development and Evaluation should develop new syllabi for these courses. [RNPE increased minimum ten, maximum eleven subjects, with
eight core subjects, including agriculture and religious and moral education. Development studies was removed—to be taught under social studies.]

The RNPE recommendation that in the junior secondary schools Agriculture be taught and examined as a core subject has been implemented. In addition each student must take a second practical subject drawn from Art, Home Economics, Design and Technology and Business Studies. Art was moved from being clustered with Moral and Religions Education and Physical Education to be one of the four practical subjects. This change provided better articulation between Art in the junior secondary schools and Art and Design in the senior secondary schools.

In the senior schools Recommendation 42 was in 12 parts and is summarized below (Weeks, 1995:88):

**Pre-vocational Orientation in Senior Secondary Schools:** to facilitate the orientation of schools to the world of work; the localization of the examinations; the assistance of the Curriculum Development Unit in the development of practical and business subjects (syllabi and materials) and to emphasize integration across subjects; continuous assessment should be weighted in the final grading of students; there should be more practical and work-related subjects in the curriculum; management structures should be strengthened; links between the school and commerce and industry should be established; the research unit should conduct regular tracer studies of school leavers to assist career guidance and curriculum development; all senior secondary school teachers should acquire computer literacy and the supply of an adequate number of computers to schools is required; practical and business subjects in senior schools should build on what will be taught in junior schools in the future; all teachers should receive training in guidance and counselling and exposure to commerce and industry at Teacher Training Colleges; the reliance on expatriates should be reduced; adequate budgets for practical and commercial subjects are required; supervisory staff need to be retrained to achieve an orientation to the world of work; revitalize guidance and counselling at the schools (office, reduced teaching load, dedicated classroom, relevant material); practical subjects clubs and clubs that support work should be encouraged.

“The goal of preparing senior secondary students for the transition to further education and training, and for working life, is to be achieved by providing them with a sound general education, coupled with strategies which develop their awareness of the world of work, particularly through guidance and counselling” (Botswana, 1993:175).

**2002**

Following the acceptance of the Revised National Policy on Education in April 1994, the Ministry of Education established a body to oversee the implementation of all the new policies. In 1999 it reported on its work (Ministry of Education, 1999). Both successes and problems of implementation are discussed frankly in this document.

One major shift in what is happening in the secondary schools has come with the phased introduction of the Botswana General Certificate of Secondary Education (a localized Cambridge Overseas School Certificate) beginning in 1999. This was point 42 (a) in the NCE report as
summarized above. The impact of these changes, and progress on implementing all 12 parts of Recommendation 42 will be discussed in more detail below (see page 15).

**Literature Review**


Vocationalization is defended and justified based on a number of expectations, including that it:

1. Will be cost effective and facilitate economic development by developing skills, through training people to replace expensive expatriates;
2. Will equip youth to return to their community or villages ("back to the village" syndrome) where they would become engaged in self-employment or job creation in the informal sector;
3. Would help to solve the "time bomb", the spectre of the unemployed school leaver who joins the revolutionary opposition; and
4. Would serve to stem urban drift

Politicians want to use vocational education to solve problems that are not educational, such as unemployment (Bacchus, 1988). It has been observed that in the United States vocational education persists because it is good politics, because it is visible and politicians are seen as doing something about youth unemployment (Wilms, 1988:91). An assumption of double deficiency is made by politicians and planners—formal education is deficient because the schools are perceived as failing to equip pupils, while the pupils are deficient because they are perceived as finishing school without any skills (Saunders, 1988:156). This leads to the false expectation—"if only youth had skills all the problems would be solved" (OECD 1983:11). That academic education may be the most "vocational" is ignored, even though Philip Foster has argued this point beginning nearly 40 years ago (Foster, 1965; Foster, 2002; King and Martin, 2002).

The major issues as they relate to Botswana as identified in 1993 are summarized as follows (Weeks, 1997):

1. **Parental aspirations**

Parents prefer to send their children to academic schools (this is demonstrated by a significant proportion of Batswana parents who can afford it paying for private schooling in Botswana, South Africa and Zimbabwe). Those who are well to do and in the professions have benefited from academic schooling. This and the demand for more places in formal secondary schools are the main reasons for the decline of Swaneng Hill and related innovations (van Rensburg, 1974; 1992).
2. Teacher resistance
Teachers are not convinced that the role of the school is to provide job related skills. They feel less competent to provide vocational training as required by the world of work. Headteachers are more concerned about their examination results than other criteria of success.

3. High cost of vocationalization
Technical education is expensive in terms of both buildings, equipment and teachers. Many governments lack the political will to divert scarce resources to benefit a minority. As a result, in most cases, schools that try to vocationalize are poorly constructed, equipped and staffed for vocationalization. Unfortunately this is also the case in Botswana where there have been adequate resources.

4. Employer resistance
Employers tend to look down on the products of vocational education as inferior—they prefer to train them themselves on the job (the schools are seen as being out of touch with the realities of business and the world of work).

5. Absence of support systems for vocational graduates
Rarely are adequate support systems mounted for graduates of practical or vocationally oriented schools. For example, in Zimbabwe, there is a shortage of land for those who opt to go into farming (banks and other lending agents are not prepared to finance school leaver projects). The informal sector quickly becomes saturated with school leavers with limited skills and workers retrenched from the modern sector. Parents and their children do not see any advantage in taking vocational subjects since they do not enhance one's opportunities in either the formal or informal sector.

Evidence from Kenya, Sierra Leone, Tanzania, Zambia and Zimbabwe confirms the above general comments on the failure of vocationalization in Africa and studies in Colombia, Papua New Guinea and elsewhere reveal the same picture (see references listed above). Some experts have argued that resources are better utilized in extending and improving general education and thus producing a better and trainable work force for commerce and industry. It is claimed that employers are in a better position to train workers for the skills they require than formal school systems.

Financial Constraints
The economic value of vocational education as a panacea for the ills of structural unemployment can be challenged. (Psacharopoulos and Loxley 1985:28).

One of the main problems found in most countries militating against the successful implementation of vocational projects is that of inadequate financing for buildings, equipment and teachers. This has resulted in many of these programmes assuming a "barefoot" approach to vocational education (King 1988a). In nearly every study the unit cost per student for technical subjects is higher than for academic subjects (Cumming 1985; 1988). Heyneman suggests that because of the high costs involved in implementing vocationalization, Ministries of Education in developing nations should give serious consideration to reducing or even eliminating workshops from secondary schools and instead expand educational opportunity by increasing the number of secondary places. This is better than keeping vocationalization "as it is and so experience,
continued implementation problems, continued decline of educational quality, and continued ceilings on enrolment levels resulting from the high secondary unit costs” (Heyneman,1985:288). It is often forgotten that workshops for practical subjects generally are unable to accommodate more than 20 students while academic classrooms easily accommodate up to 45 students—this tends to immediately double the per unit costs of vocational education compared to the academic model. Examination costs for practical subjects are two to four times more expensive per candidate when compared to academic subjects—the high costs of meaningful practical assessment of vocational education is also a serious constraint (Chisman, 1987:40-42).

The litany of constraints on equipping vocational programmes has remained consistent for years: equipment is costly and hard to get (Malawi); it breaks down because teachers are not trained to use it properly (Gambia); it is difficult to keep up-to-date with the latest technology, and maintenance is either non-existent, poor or costly (Australia, Malawi, Mauritius, Trinidad and Tobago). Appropriate support materials are lacking ... (Maldives, Bangladesh) as are electricity for workshops and an efficient transport system for delivering materials (Fiji). Zambia comments on the difficulty of securing infrastructure for rural schools’ productive work component: water, land, transport, and tools of an appropriate design and cost. (Coome, 1988:24).

The World Bank (Jones, 1992) in its post-1980 strategy, cautions developing nations, and warns them against jumping on the bandwagon of diversification. World Bank policies changed significantly in the 1980s (World Bank, 1991). There are three key reasons given for this:

1. The high costs of vocationalization;
2. Unrealistic employment objectives; and
3. Expensive educational facilities end up being underutilized because they can not keep up with changes in the economy and the demand for skilled labour.

Diversified secondary school is a questionable method for training large numbers in specific vocational skills. (Heyneman, 1985:286).

**Cost-effectiveness**

One method that has been used to judge "cost-effectiveness" is tracer studies of students who have completed practical courses. Many of these have been carried out in the developing world, yet they have one common finding: graduates of practical programmes tend to try and shift into academic training (Chisman, 1987; Jones, 1992; Lauglo and Lillis, 1988; Psacharopoulos and Loxley, 1985). There exists no positive relationship between the skill students have acquired and its utilization (Coome, 1988). Those students who have had some exposure to vocational subjects, within a mainly academic curriculum, are found to have no advantages over other job seekers. A definite hierarchy exists in the relationship between types of practical courses and their cost-effectiveness—the less expensive (Agriculture, Commerce and Home Economics) tend to be the more cost-effective, while the more expensive (Electronics, Mechanics, Metal and Woodwork) are less cost-effective. A course is less cost-effective where people end up in further studies or occupations that bear no relationship to their initial training. Studies also reveal that work place productivity is not enhanced by vocational education (Copa and Copa, 1992, Cumming, 1988).
Vocationalization

At a minimum vocationalization is the introduction of practical subjects into schools, for example, agriculture, commerce, design and technology, and home management—a move away from purely traditional, academic subjects. Vocationalization can go beyond this to include integration between practical and academic subjects, learning from self-reliance activities, and learning through clubs and societies. In some cases the whole school is looked at as a productive enterprise, offering a variety of experiences from administration through to technical production. (Mudariki and Weeks, 1995: A12-2).

The tension involving the development of secondary schooling in Botswana has been between the pressures to achieve full vocationalization versus opting for only providing some pre-vocational education through a limited number of practical subjects. The debate which is an old one, was reformulated in the 1960s by Philip Foster as “The vocational school fallacy in development planning” (1965). I tackled his thesis in the context of educational reform in Papua New Guinea, arguing that Foster's analysis did not apply to all vocational training, and that the claim that the most “vocational” education was academic schooling had become the “Foster Fallacy” (Weeks, 1976). The “Foster Fallacy” has been reviewed recently by King and Martin (2002). In their analysis they conclude:

Foster’s message today as in 1963 remains relevant for any attempts to use schools to deliver massive changes in attitude and aspiration in the absence of any parallel initiatives in the larger economic environment. (page 24),

King and Martin (2002) give Foster the last word:

I must add that I am personally in favour of attempts at more diversified types of curriculum and school systems for pedagogical and educational reasons. Don’t expect such changes to influence the realities of the labour market ... it is simply hypocritical to talk about more “practical” training in African schools when most are so poor that they can’t even afford a few nails and hammers at best! (page 25).

In 1993 eight different approached to vocationalization or diversification were identified (Mudariki and Weeks, 1994: A12-4):

1. Introduction of "biases" or practical subjects in academic high schools;
2. Comprehensive high schools with streaming;
3. Technical high schools;
4. Cluster high schools;
5 Integrated work-study schools;
6. Development of clubs and societies with practical orientation;
7. Production units in schools; and,
8. Second chance training for mature school leavers through vocational training centres.

This study found that the introduction of practical subjects or “biases” in secondary schools tended to not lead to significant skill acquisition; instead it was supported, even if poorly implemented, because it was assumed it provided students with an orientation to other pursuits besides white collar jobs.

Vocationalization can be linked to "experiential education", or learning by doing. Practical education is seen as enhancing learning and promoting cognitive development (Coombe, 1988: Box 6). School production units in Zambia have had as an objective to develop self-reliance,
discipline, leadership, positive attitudes to work, and to close the gap between mental and manual work, but since they were introduced by Presidential decree in 1975 they have, in most schools, failed to achieve their objectives (Achola and Kaluba, 1989). Many governments justify attempts at promoting practical education on the grounds that they are developing a more relevant and self-reliant form of education than that inherited from the colonial masters (Lauglo and Lillis, 1988). The objective is to provide skills for the development of the formal and informal sector. Diversified secondary education becomes the foundation for further education or training in different areas—it is assumed that the best of those students who complete practical courses will go on to higher levels of vocational or technical training. The tragedy of the situation worldwide is that these goals, though noble sounding, are rarely achieved, even though a wide variety of approaches to achieve these objectives have been developed and tried.

After two decades of implementation the promises of vocationalization appear to be largely unfulfilled. Indeed, it now seems that vocationalization might, after all, be simply an illusion which it is too costly to pursue and unlikely to yield the expected outcomes. Yet the lure of vocationalization still persists in most African countries. (Wright 1988:116).

Practical Subjects in Botswana in 1992

Botswana, compared to many other developing countries, is a "resource rich" nation, and though it has been riding a number of booms and busts, the overall situation is one of "sustained development". Botswana has not experienced the structural readjustment policies which have devastated other developing countries, yet resource constraints still exist and vocationalization has suffered as a result. Botswana has been in a position to pay for what it wants. Aid donors have also, as elsewhere, been interested in vocationalization. In spite of all this the development of practical subjects up to 1992, in secondary schools, has been under-resourced, inadequately maintained, poorly planned and implemented, and suffered from many of the same constraints found in other countries in Africa. For the relevant literature on Botswana see (Hinchliffe et. al. 1988; Hinchliffe, 1990; Kann et. al. 1988; Mansell, 1991; Mudariki, 1997; Mudariki and Weeks, 1992; 1995; Botswana, 1992; Salkin, 1992; Tempest, 1992; van Rensburg, 1974; 1992; 2001; Weeks, 1997).

In 1992 the author studied the vocationalization of secondary schools at the request of the second National Commission on Education 1993 (Mudariki and Weeks, 1995). The case studies of eleven senior secondary schools in Botswana revealed that the situation in the schools, when one examined the limited "vocationalization" that had occurred so far through the implementation of practical subjects, was far from ideal. The schools faced staff shortages, lack of adequately trained and motivated teachers, a dependence on expatriate instructors, poorly planned and equipped facilities, and a general lack of support from administrative hierarchies both within and outside the schools and in society in general. In 2002 the situation has improved, but the same problems have been found to still be present (this will be considered in detail below).

The number of students in senior secondary schools who were able to study practical subjects in 1992 was limited; and though considerable progress has been made, was still limited in 2001. In Table 2 what had been achieved in the senior secondary schools in 1992 is compared to the achievements a decade later, by 2001.
Table 2: Number Students taking Practical Subjects—COSC/BGCSE—1992 & 2001

<table>
<thead>
<tr>
<th>Subject</th>
<th>1992</th>
<th>2001</th>
<th>Change %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
</tr>
<tr>
<td>Agriculture</td>
<td>2,891</td>
<td>45.1</td>
<td>10,732</td>
</tr>
<tr>
<td>Art (Art &amp; Design)</td>
<td>640</td>
<td>10.0</td>
<td>2,464</td>
</tr>
<tr>
<td>Commerce</td>
<td>730</td>
<td>11.4</td>
<td>6,979</td>
</tr>
<tr>
<td>Principles of Accounts</td>
<td>374</td>
<td>5.8</td>
<td>2,002</td>
</tr>
<tr>
<td>Food &amp; Nutrition</td>
<td>821</td>
<td>12.8</td>
<td>2,390</td>
</tr>
<tr>
<td>Fashion &amp; Fabrics</td>
<td>215</td>
<td>3.4</td>
<td>953</td>
</tr>
<tr>
<td>+ Home Management</td>
<td>123</td>
<td>1.9</td>
<td>532</td>
</tr>
<tr>
<td>* Computer Studies</td>
<td>14</td>
<td>0.2</td>
<td>547</td>
</tr>
<tr>
<td>**Design &amp; Tech.</td>
<td>176</td>
<td>2.7</td>
<td>3,671</td>
</tr>
<tr>
<td>++ Business Studies</td>
<td>-</td>
<td>-</td>
<td>306</td>
</tr>
<tr>
<td>@Technical Drawing</td>
<td>782</td>
<td>12.2</td>
<td>-</td>
</tr>
<tr>
<td>@Woodwork</td>
<td>684</td>
<td>10.7</td>
<td>-</td>
</tr>
<tr>
<td>Total taking PS</td>
<td>7,450</td>
<td></td>
<td>30,576</td>
</tr>
<tr>
<td>TOTAL Form Five</td>
<td>6,406</td>
<td></td>
<td>16,524</td>
</tr>
<tr>
<td>Average taking PS</td>
<td>1.16</td>
<td></td>
<td>1.85</td>
</tr>
</tbody>
</table>

* = one school in 1992; 14 schools in 2001  
** = five schools in 1992; all 27 senior secondary schools in 2001  
+ = fourteen schools in 2001  
++ = three schools in 2001  
@ = Technical Drawing and Woodwork (also electronics and metal work which were only taught at one school) were phased into Design and Technology  

Between 1992 and 2001 the number of students in senior secondary schools taking the COSC/BGCSE rose by 258 percent (from 6,063 to 16,524). The increase in enrolments in all ten practical subjects was greater than for academic subjects. **Between these years the number of students taking a number of practical subjects increased dramatically, particularly in the practical subjects given priority:** Agriculture increased 371 percent; Commerce, 956 percent; Principles of Accounts rose 535 percent; Food and Nutrition, 291 percent; Fashion and Fabrics, a course which students have not done well in, rose by 443 percent; Home Management, 432 percent; and Art (now Art and Design), 385 percent. Woodwork, Metalwork, Electronics and Technical Drawing were discontinued (they were absorbed by Design and Technology). This picture is shown in Table 2.
Table 2 also shows us the proportion of students in 1992 and 2001, who were able to take practical subjects. While in 1992 Agriculture led, with 45 percent of the Form Five students, the other practical subjects ranged from only 0.2 percent to nearly 13 percent. In 2001 Agriculture was now taken by 65 percent of the students, Commerce by 42 percent, and Design and Technology 22 percent. The other subjects ranged from 3.2 to 14.9 percent. By 2001 the senior schools had expanded, had new buildings and equipment, and more practical subject teachers; but targets, as we will see in the discussion further on, have not been met as there were still shortages, which the system is working hard to overcome.

In addition Table 2 demonstrates the commitment to expand the provision of practical subjects in the senior secondary schools. Where as the number of students in the 27 schools taking the final examination has grown by 258%, those taking practical subjects has risen by 410%. In 1992 there were facilities and staff for an average of 1.16 students to take any practical subjects; by 2002 this had risen to 1.85 (or nearly two practical subjects to a student).

The ability of students to take any practical subjects is constrained by the number of schools that offer the subject. For example the subject Home Management requires a demonstration flat—in 1992 of the seven schools where students (only females) took home management, not all of them had proper demonstration flats. In 2001 Home Management was taken at 14 of the senior schools. In 2002 the schools were introducing the new Home Management syllabus, and it was the intention of the Ministry of Education that all 27 senior schools would offer Home Management, but incomplete facilities and a shortage of teachers was undermining this objective. These problems should be resolved in the next few years and then all senior schools would be able to offer Home Management.

Even when a practical subject is offered at all schools, as is Food and Nutrition, the number of students that can take it is constrained by staff and facilities, and the popularity of the subject. Poor examination results seem to cause students to avoid a subject, if they can. In 1992, the average in Fashion and Fabrics was 36 students per school—when the schools have between 1,000 and 1,600 students). In the 1992 COSC Fashion and Fabrics was taught at 17 schools, but one school had 52 students taking the subject, while at the other 16 the average was ten students to a class. In 2001 and 2002 Fashion and Fabrics was experiencing some resistance from students and small classes of eight to 12 students, instead of the required 20 were observed. This will be considered in more detail below.

The Home Economics classrooms are limited in the number of students that can work in them at a time (in 1992 there were generally eight stoves for Food and Nutrition, or space for 16 students, but frequently not all the stoves were functional). In the new facilities that have been built in the last few years the new classrooms for Food and Nutrition have 14 stoves (but by 2002 not all of these new classrooms have been fully equipped). The staff and facilities were available for more students to take Fashion and Fabrics, but this time the numbers were constrained by the 'reputation' of the subject as noted above. The results were not uniform in 2001 across the 24 schools taking the subject: three schools had no failures; seven schools had up to a third failures.
Staffing Constraints

Overall statistics from the Ministry of Education Department of Secondary Education for March 1993 (for first subject taught, excluding non-teaching heads and teachers on leave and teachers for which there was no information) demonstrate the dependence then on expatriate teachers to cover practical subjects—see Table 3.

Table 3: Background of Teachers (SSS only) by First Subject Taught 1993 (Citizen/Non-citizen) (Unqualified in brackets—percentages read across) #

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>CITIZEN</th>
<th>NON-CITIZEN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRACTICAL SUBJECTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts</td>
<td>2 (1)</td>
<td>9 (0)</td>
<td>11 (1)</td>
</tr>
<tr>
<td>Agriculture</td>
<td>102 (16)</td>
<td>75 (1)</td>
<td>177 (17)</td>
</tr>
<tr>
<td>Art</td>
<td>12 (0)</td>
<td>30 (0)</td>
<td>42 (0)</td>
</tr>
<tr>
<td>Design &amp; Tech</td>
<td>51 (1)</td>
<td>111 (1)</td>
<td>162 (2)</td>
</tr>
<tr>
<td>Home Economics</td>
<td>98 (2)</td>
<td>55 (3)</td>
<td>153 (5)</td>
</tr>
<tr>
<td>Total Practical</td>
<td>265 (20)</td>
<td>280 (5)</td>
<td>545 (25)</td>
</tr>
<tr>
<td>Percentage</td>
<td>48.6 %</td>
<td>51.4 %</td>
<td>100 %</td>
</tr>
<tr>
<td>ACADEMIC SUBJECTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>994 (51)</td>
<td>516 (12)</td>
<td>1510 (63)</td>
</tr>
<tr>
<td>Percentage</td>
<td>65.8 %</td>
<td>34.2 %</td>
<td>100 %</td>
</tr>
<tr>
<td>Grand Total</td>
<td>1189 (71)</td>
<td>796 (17)</td>
<td>1985 (88)</td>
</tr>
<tr>
<td>Percentage</td>
<td>59.9 %</td>
<td>40.1 %</td>
<td>100 %</td>
</tr>
</tbody>
</table>

# Source: Department of Secondary Education, Secondary Teacher Survey, March 1993

For the teachers whose first teaching subject is Accounts (Commerce, Principals of Accounts and Economics), Agriculture, Art, Design and Technology and Home Economics, 51 percent were non-citizens, compared to academic subjects (English, Mathematics, Science, Setswana, Social Studies and Religious Education) where only 34 percent of the teachers were non-citizens. Though this information is not complete (not all teachers were covered, and second subjects taught ignored) and is therefore not reliable, it does demonstrate the trend and the problem. Agriculture (58 percent) and Home Economics (64 percent) were in 1993 subjects that were more localized than the other practical subjects. The number of unqualified teachers in practical subjects is limited, with 64 percent found teaching Agriculture (16 out of 25)—while of 88 unqualified teachers required to fill vacancies, 72 percent are in academic subjects. It is
impressive that of 162 teachers listing Design and Technology as their first subject only two were unqualified (one citizen and one non-citizen).

The data for 2002 are not comparable to 1993, because both junior secondary and senior secondary school teachers were now lumped together. But the picture in 2002 is illustrative of what has been accomplished in implementing practical subjects in Botswana (both the supply and retention of teachers). See Table 4.

Table 4: Background of Secondary Teachers (CJSS and SSS) by First Subject Taught 2002 (Citizen/Non-citizen) (Temporary teachers in brackets—percentages read across) #

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>CITIZEN</th>
<th>NON-CITIZEN</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRACTICAL SUBJECTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commerce</td>
<td>14 (17)</td>
<td>41</td>
<td>72</td>
</tr>
<tr>
<td>Agriculture</td>
<td>421 (116)</td>
<td>130</td>
<td>667</td>
</tr>
<tr>
<td>Art</td>
<td>348 (119)</td>
<td>67</td>
<td>534</td>
</tr>
<tr>
<td>Design &amp; Tech</td>
<td>292 (65)</td>
<td>163</td>
<td>520</td>
</tr>
<tr>
<td>Home Economics</td>
<td>183 (73)</td>
<td>43</td>
<td>299</td>
</tr>
<tr>
<td>Computer Studies</td>
<td>2 (7)</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Total Practical</td>
<td>1,260 (397)</td>
<td>452</td>
<td>2,109</td>
</tr>
<tr>
<td>Percentage</td>
<td>59.7 (18.8)%</td>
<td>21.4%</td>
<td>99.9%</td>
</tr>
<tr>
<td><strong>ACADEMIC SUBJECTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Academic</td>
<td>3,473 (702)</td>
<td>572</td>
<td>4,747</td>
</tr>
<tr>
<td>Percentage</td>
<td>73.2 (14.7)%</td>
<td>12.1%</td>
<td>100%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>4,733 (1,099)</td>
<td>1,024</td>
<td>6,856</td>
</tr>
<tr>
<td>Percentage</td>
<td>69.0 (16.0)%</td>
<td>14.9 %</td>
<td>99.9%</td>
</tr>
</tbody>
</table>

# Source: Teaching Service Management, Secondary Teacher Survey, June 2002

Table 4 also shows that there are serious shortfalls in the supply of trained citizen teachers for practical subjects. For example Design and Technology, if fully implemented, requires $7 \times 27 = 189$ teachers for senior schools and $206 \times 3 = 618$, teachers for junior schools for a total 807 teachers; but currently we have only 300 qualified citizens, which equals a short fall of 500 Design and Technology teachers at both levels.

The situation is also serious for Home Economics, as there is still a short fall of 570 citizen teachers [$5 \times 27 = 135; 3 \times 206 – 618$ Total 753; have 183 short 570]. Art and Design are short 172 teachers [$4 \times 27 = 108, 2 \times 206 = 412$ Total 520; have 348; short 172]. Commerce is the
most serious as the system requires 807 teachers; but only has 14 citizen teachers. Agriculture require 807 and have 421 and Computer Studies requires two qualified citizen teachers in each school or 466, but we only have 2. (this is because Science and Mathematics teachers cover Computer Awareness/Studies).

Table 5: Background of Secondary Teachers (CJSS and SSS) by First Subject Taught 2002 (Citizen/Non-citizen) percentages read down #

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>Junior schools</th>
<th>Senior Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Citizen</td>
<td>Non-Citizen</td>
</tr>
<tr>
<td>Commerce</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Agriculture</td>
<td>469</td>
<td>52</td>
</tr>
<tr>
<td>Art</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>Art &amp; Religion</td>
<td>395</td>
<td>57</td>
</tr>
<tr>
<td>Design &amp; Tech</td>
<td>331</td>
<td>85</td>
</tr>
<tr>
<td>Home Economics</td>
<td>248</td>
<td>35</td>
</tr>
<tr>
<td>Computer Studies</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Practical Studies</td>
<td>170</td>
<td>35</td>
</tr>
<tr>
<td>Total Practical</td>
<td>1,638</td>
<td>267</td>
</tr>
<tr>
<td>Percent practical</td>
<td>35.1%</td>
<td>53.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Subjects</td>
<td>3,024</td>
</tr>
<tr>
<td>Percent academic</td>
<td>64.9%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>4,662</td>
</tr>
<tr>
<td>Percentage</td>
<td>100%</td>
</tr>
<tr>
<td>Percentage across</td>
<td>70.5%</td>
</tr>
</tbody>
</table>

# Source: Teaching Service Management, Secondary Teacher Survey, July 2002 (this table is different from Table 4 and does not match it).

In Table 5 a different “take” where slightly different figures are presented (information on temporary teachers is missing). What is important in this table is that a picture is provided of the difference between junior and senior schools which is not available in Table 4. This table demonstrates that there is greater reliance so far, in absolute numbers, on expatriate teachers in the junior schools when compared to the senior (but proportionally the dependence is greater in the senior schools; 22.4 percent senior to 9.6 percent non-citizen in the junior schools).
These figures are for 2002 and do not take account of the future growth of the education system which will result in even greater demand for qualified practical skills teachers (and are subject to correction as information on second subjects taught is not available).

**Practical subjects in 2002**

Pre-vocation preparation has changed the orientation of secondary schools. They should now (Ministry of Education, 1999:31):

*Arm students with the skills they will need when they enter the working world. I A Task Force on Vocational Preparation has produced guidelines for the implementation of pre-vocational education in secondary schools. The guidelines emphasise the vocational orientation of all subjects in the curriculum, increased access to practical subjects, foundation skills and guidance and counselling. In addition subjects are being re-packaged into options so that all students will choose at least one creative and one vocational subject. Strategies for the implementation of guidelines have been developed and workshops have been conducted to disseminate information and sensitise relevant stakeholders.*

**Junior Secondary versus Senior Secondary**

Structurally junior and senior secondary schools are very different. While most senior schools have boarding facilities, the exception being the large urban schools, most junior secondary schools are day institutions with only a few in more remote areas having boarders. Day schools, because students must generally walk home, are more limited in the type of activities they can offer in afternoons, but this is not perceived as a constraint by staff as students are required to stay at school up to six p.m. for afternoon study and activities (including sport and clubs or extra study).

Practical subjects in junior schools tend to be both more generic, and the syllabus is designed to articulate with that of the senior schools. Home economics divides into three parts in the senior schools, while it is unified in the junior schools. While all students take Agriculture in junior schools it is an option in the senior schools. Though students should be introduced to individual projects and research exercises in the junior schools, this approach is now more developed at the next level. Art in the junior schools is now taken as a practical option, and is articulated with Art and Design in the senior schools. Business Studies at the junior level should now articulate with the new Business Studies syllabus that is being introduced in all senior schools (it was in only three senior schools in 2001).

The objectives of the junior secondary school curriculum (Botswana, 1993:155-156) are:

1. Proficiency in the use of Setswana and English language as tools of effective communication, study and work;
2. An understanding of society, appreciation of culture and sense of citizenship;
3. The capacity to use computation skills for practical purposes;
4. An understanding of scientific concepts and interest in the natural world;
5. An appreciation of technology and an acquisition of basic skills in handling tools and materials;
6. An understanding of business and everyday commercial transactions;
7. Computer literacy;
8. Critical thinking, problem-solving ability, individual imitative and interpersonal skills;
9. Readiness for the world of work.

Further information on the objectives for junior and senior schools has already been provided on pages nine and ten of this paper.

**Implementation of the Revised National Policy on Education [RNPE]**

The recommendations of the Government (Botswana, 1994) have been taken extremely seriously by the Ministry of Education. An implementation unit was established headed by a senior person at the Permanent Secretary level (Botswana, 2000). The 134 major recommendations were diligently pursued (for a summary of them all see Weeks, 1995). Recommendations Numbers 33 and 42 on pre-vocational orientation in secondary schools has also been followed with varying degrees of success. These will be examined below in further detail.

**The Context: Practical versus Core Academic Subjects**

The tension between practical subjects and core academic subjects is not a real problem at the junior schools. As has been noted all students must take Agriculture and then select an additional practical subject (chosen from Art, Design and Technology, Home Economics and Business Studies) and an option from Moral and Religious Education, Physical Education and Music.

When the fifty percent of Form Four students proceed the next year to Form Five they are expected to continue in at least one practical subject or “option”, and this now includes Agriculture. Most senior schools require that for a student to select a practical subject in Form Five that they had done it in Form Four. This is intended to achieve articulation and enable some depth, for example by taking Design and Technology for five years. As has been noted above the streaming of students into the three approaches to Science has significant implications for the development of practical subjects.

**Status of Each Subject [Agriculture, Commerce (three subjects), Computer Studies, Art and Design, Design and Technology, Home Economics (three subjects)]**

Practical subjects have been given a prominent emphasis in the architecture and layout of both the junior and senior schools. In the past decade nearly all schools have been completely rebuilt (an investment unparalleled in Africa, and costing hundreds of millions of Pula). Junior schools have Computer Laboratories (for Computer Awareness which is not examined; but so far only 51 of 206 junior schools have had computers delivered to their laboratories because there is a severe shortage of teachers, but it is planned to equip the remaining laboratories by December 2002 and begin a process of in-service training for teachers of Computer Awareness), a Design and Technology and Home Economics block; a Machine room for Design and Technology; a new Art room and space for ceramics and sculpture; and so on. Recently “pavilions”, with two
substantial rooms and storage areas under one roof, have been built at the larger junior secondary schools to provide additional space for Design and Technology.

In the senior schools the new facilities for Art and Design, Home Economics, Computer Studies and Design and Technology are among the best in the school. Art has been provided with studios (equivalent to four or five classrooms and ample space for storage, photography and printing, plus staff offices and displays). Home Economics is in many school housed in a new two story building with staff and storage spaces and at least four classrooms for the three subjects. Design and Technology has also been provided either with a large quadrangle or a massive two story building bigger than that provided to Home Economics and including space for a CAD computer room (ten computers each are being distributed in 2002), welding, large work and storage spaces, and sophisticated security against theft. The new computer laboratories for Computer Studies (examined) and Computer Awareness (non-examined) are usually central and allow for up to 40 computers. All these developments are most impressive.

Unfortunately contractors have “absconded” (stopped work) at two senior schools (they have been taken to arbitration, which keeps getting deferred) and are well behind in their schedule at others. At some senior schools where the buildings are finished (for up to two years), equipment has not yet been provided, which has created problems for the teachers using the new spaces; e.g. in Home Economics beautiful new laboratories with 14 stoves, but no pots and pans. In Design and Technology, large classrooms, but old benches and desks, and no computers for CAD (though they are promised). Teachers have been told to make their own benches and renovate old stools and desks, and a number of weekend workshops have been held to demonstrate how easily this can be done.

The Ministry of Education has provided a position for Head of Options in junior schools and a coordinator for each practical subject. In the senior schools there is a promotional position of Head, Practical Subjects (or Options) with coordinators for each practical subject. Some inconsistency exists as this promotional position in some schools has been won by a teacher from Religious Education or Setswana. This means that the practical subjects are being coordinated by an individual who may lack comprehension of the five practical subjects in junior schools and ten diverse practical subjects in senior schools.

Another problem found in the senior schools is what subjects are grouped under the Head, Practical. One school had all ten subjects under the HoD Practical, while another had only Design and Technology, and two Home Economics subjects under this supervisor; while Art and Design was with Humanities; Agriculture and Computer Studies with Science; and Commerce with Humanities. These alternative arrangements will create difficulties with votes (budgets for ordering materials), communication and potential integration across practical subjects, and so on; as it is preferable to have one head responsible for all practical subjects.

Assessment—Performance in Practical Subjects

The failure rate (F, G, U) compared to the proportion of students achieving Credits A*, A, B and C) across the practical subjects and core academic subjects in the 27 senior schools in 2001 is
provided in Tables 6 and 7 (missing is the results for D and E, or “Pass” which can be calculated by subtracting the other two from 100):

**Table 6: Performance in Practical Subjects in 2001 (COSC/BGCSE) [with percentages read across by subject]**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Number</th>
<th>% Fail</th>
<th>% Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art &amp; Design</td>
<td>2,464</td>
<td>0.9</td>
<td>79.1</td>
</tr>
<tr>
<td>Design &amp; Technology</td>
<td>3,671</td>
<td>2.7</td>
<td>56.5</td>
</tr>
<tr>
<td>Agriculture</td>
<td>10,732</td>
<td>4.9</td>
<td>64.3</td>
</tr>
<tr>
<td>Home Management</td>
<td>532</td>
<td>8.1</td>
<td>52.3</td>
</tr>
<tr>
<td>Food &amp; Nutrition</td>
<td>2,390</td>
<td>8.9</td>
<td>64.3</td>
</tr>
<tr>
<td>Fashion &amp; Fabrics</td>
<td>953</td>
<td>15.6</td>
<td>40.7</td>
</tr>
<tr>
<td>Commerce</td>
<td>6,976</td>
<td>17.3</td>
<td>49.7</td>
</tr>
<tr>
<td>Computer Studies</td>
<td>547</td>
<td>19.6</td>
<td>36.2</td>
</tr>
<tr>
<td>Principles of Accounts</td>
<td>2,002</td>
<td>46.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Business Studies</td>
<td>306</td>
<td>50.3</td>
<td>17.3</td>
</tr>
</tbody>
</table>


The high failure rates in the last five practical subjects (as show in Table 6) in the schools visited by the author was attributed by staff to a number of key problems: new buildings that have not yet been supplied with equipment; inadequate budgets for materials; new and inexperienced or unqualified teachers; high turnover of teachers; teachers general lack of understanding of the new independent study/portfolio approach to Continuous Assessment (a problem which has been accentuated by a lack of leadership in inservice-training from the Design and Technology teachers most familiar with these new problem solving approaches); the general absence of any integration across practical subjects; the dependence on one to three day in-service training “workshops” at hotels or Education Centres; and all of the above combined with the general absence of school-based in-service sessions, as found in the Sciences (Thijs, 1999). In the three Commerce subjects students who are weak in Mathematics are thought to be failing these subjects. It was also suggested that Business Studies, as a new subject, with the independent study and research, was not fully understood by staff (though in Commerce, as in the Sciences, students can take an examination paper instead of doing a project).

Table 7 demonstrates fairly clearly the relationship between performance and streaming into the three science groups. The Single Science students are the ones who are most likely to fail Mathematics and get only Ds or Es in English (70 percent). They are also the students who are doing poorly in practical subjects. Only one of the seventeen schools visited actually calculated their results by streaming and performance. It can be seen that there is a correlation between streaming and performance. In a highly competitive environment, these school leavers who do not do well in English, Mathematics and their practical subjects are not likely to be sponsored for further training or find it easy to find employment.
Table 7: Performance in Core Academic Subjects in 2001 (COSC/BGCSE) School Certificate Examinations [with percentages read across by subject]

<table>
<thead>
<tr>
<th>Subject</th>
<th>Number</th>
<th>% Fail</th>
<th>% Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure Science (Physics)</td>
<td>2,460</td>
<td>3.5</td>
<td>79.8</td>
</tr>
<tr>
<td>Pure Science (Chemistry)</td>
<td>2,460</td>
<td>5.3</td>
<td>75.9</td>
</tr>
<tr>
<td>English</td>
<td>16,548</td>
<td>5.7</td>
<td>24.3</td>
</tr>
<tr>
<td>Setswana</td>
<td>16,370</td>
<td>6.6</td>
<td>42.3</td>
</tr>
<tr>
<td>Double Science</td>
<td>10,252</td>
<td>8.9</td>
<td>45.8</td>
</tr>
<tr>
<td>Pure Science (Biology)</td>
<td>2,460</td>
<td>16.5</td>
<td>62.1</td>
</tr>
<tr>
<td>Single Science</td>
<td>8,949</td>
<td>40.1</td>
<td>11.4</td>
</tr>
<tr>
<td>Mathematics</td>
<td>16,524</td>
<td>42.0</td>
<td>25.8</td>
</tr>
</tbody>
</table>


**How are the Students Assessed in the Practical Subjects?**

In the past on the Cambridge Overseas School Certificate only in Agriculture, Art, Design and Technology and Computer Studies were any credits given to Continuous Assessment in the form of a project (and not more than 20 percent). The three Home Economics subjects have practical tests that are included in the final assessment, but did not do an individual research project or portfolio. For other subjects the assessment relied 100 percent on the examination results. Now following the recommendations of the second National Commission on Education, and with the introduction of the new BGCSE beginning in 1999, all practical subjects should have up to 50 percent of each student’s final grade made up of practicals and the student’s individual project. The ability of students to perform in CA and their capacity to research, solve problems and develop a project will now count in their final assessment. These approaches are tied to Botswana’s Vision 2016 which sees a new society with the human resources to solve problems, where every student leaving secondary school is empowered to face the world of work.

Teachers in the senior schools see what has happened as the extension of assessment methods in Design and Technology to other subjects. For example in Home Economics this new approach has been phased in beginning in Form Four in Food and Nutrition in 2000, Fashion and Fabrics in 2001, and Home Management in 2002. Assessment in Food and Nutrition is now based on:

- Two hour final examination 50 percent
- Practical Test 1 (end of Form Four) 05 percent
- Practical Test 2 (end of Form Five) 15 percent
- Individual project 30 percent

Total 100 percent

The individual project (or portfolio) is assessed as follows:

1. Presentation 05 percent
2. Task analysis 10 percent
3. Planning 10 percent
4. Investigation & research 30 percent
5. Realization/model/design 20 percent
6. Communication 10 percent
7. Self-evaluation 15 percent

Total 100 percent

The problem for Home Economics teachers is that they have not been prepared in their own training to support these new types of student individual projects, and most of them do not have experience with these new modes of assessment. They also say that the school libraries and reference materials currently available do not adequately support student research projects.

What has happened in the assessment of Art in the new syllabus in Art and Design is also illustrative of the changes sweeping across the secondary system in Botswana and the constraints that still exist in the schools.

The syllabus for Art and Design has five “Modules”: Senior secondary schools in Botswana usually teach only three of these. They five are:
1. Critical and historical studies
2. Two dimension analysis
3. Photography
4. Three dimensional design a) Sculpture; b) Crafts; c) Ceramics
5. Painting and Drawing

Modules one and three are generally not taught because the teachers do not have the skills that would enable the to deliver these models. I found only one school where photography was being introduced to the students over three weeks of teaching.

Art and Design now has a ten-hour examination (four parts of 2 1/2 hours). In the course work and examinations the following are now looked for:

**Interpretative and Creative Response**
1. Express ideas visually
2. Respond in both individual and personal ways
3. Demonstrate the quality of ideas as seen by interpretation rather than by literal description of the themes
4. Aesthetic judgments.

**Personal Investigational Development**
1. Personal vision and commitment/movement towards competency in Art and Design
2. Research appropriate resources
3. Assess design problems and arrive at appropriate solutions
4. Show the development of ideas in a series of rough layouts or experiments that lead to the final studies.

Previously the exam was divided into two three-hour sessions and there was no portfolio (independent research project).
The changes in the junior secondary school syllabus will in the future provide students to the senior schools who have a better grounding in individual work and research. The standard Junior Certificate Design and Technology project should include the following:

1. Cover
2. Contents page
3. Theme page
4. Definitions
5. General analysis
6. Situation
7. Problem
8. Brief
9. Specifications
10. Research (Existing ideas; Intended ideas)
11. Development
12. Working drawings
13. Material list
14. Production plan
15. Making plan, and

Though the name of the programme “Art” in the senior schools has been changed to Art and Design, some of the other practical subjects have not changed their name to reflect the new content and approaches. Home Management perhaps should be called “Home Science” and Food and Nutrition should be changed to “Food Technology” while Fashion and Fabrics is now more like “Fashion and Design”.

The new syllabus in Agriculture has introduced some new topics: game farming, genetics, biotechnology and farm machinery (which used to be optional) while students may select from one of four optional topics: crop husbandry, Livestock husbandry, farm machinery and ornamental horticulture.

**Computer Literacy for Staff and Students and Computer Studies**

Computer Studies as a subject to be examined at the end of Form Five was first introduced in 1991 at Lotsane Senior Secondary. Because of severe constraints in both staffing and the supply of computers only 14 schools offered Computer Studies (to 3.3 percent of the Form Fives) in 2001. During 2002 the remaining 13 laboratories are to provided with computers and it is anticipated all schools will begin offering Computer Studies as an option in 2003.

The pioneer school, Lotsane, has not done well recently in Computer Studies recently (50 percent failed in 2000; 31 percent in 2001). This is attributed to poor staffing and a high turnover of staff. The Ministry of Education is pushing to ensure that laboratories are established and up-to-date at all schools (for example Lotsane is still using third generation Macintosh LC475s). Schools are having difficulty replacing antiquated hardware and some are unable to spend their funds on time because they fail to cope with the tendering process, Lotsane lost P165,000 they had been allocated for new computers in April 2002, for this reason.
Computer Awareness (which is not examined) for all Form Fours is a complicated programme if you have 500 to more than 800 students in the Form. What is achieved at the schools is dependent on the participation of other staff. Teaching Service Management knows of only ten qualified computer teachers in all 233 secondary schools. In their absence Computer Awareness is usually taught by staff from Mathematics, Science or other departments. A syllabus for Forms One to Three and text books have been distributed to junior schools. Computer Awareness for Form Four appears to be at the whim (what they know and what they think should be taught) of the teachers who take responsibility for it, though guidelines exist. Student projects in the various practical subjects are rarely “word processed”. Often just the cover is done on a computer, and then the student may have to get a friend who has mastered the skills to do it for them.

Access by staff to computers at most secondary schools was still very constrained. The will to change in the next few years is demonstrated by the equipping of all computer laboratories 2002; and that some practical subject departments will get computers (like Art and Design, Design and Technology and Home Economics).

**Choice of Practical Subjects**

In the junior schools students have a bit more flexibility and they can do a rank order selection of the practical subjects they would like to take. Numbers are restricted by class size (usually not more than 20 to Art, Design and Technology and Home Economics) and availability of teachers. Students take a printed form home and they are meant to discuss their choices with their parents or guardian. Choice of practical subjects is also subject to peer pressures, as students want to join their friends when they take a practical subject, but friendship is independent of both prior learning and academic ability, so this approach to selecting what practical subjects to take causes problems at both junior and senior schools.

While in the junior schools 100 percent of the students now take two practical subjects, in 2001 in the senior schools (as shown in Table 2) and average of 1.85 students were taking two practical subjects, with agriculture the most “popular”.

In the senior schools Form Four students also have a very limited choice. An orientation is usually held during the first two weeks of school, and staff from the various practical subjects try to “sell” their subject to the students. At all senior schools visited the teachers believed that students who had done a practical subject in junior school wished to change to another subject in Form Four, which was contrary to the policy of continuing in one of the subjects taken in junior school. As has been noted above most Pure Science students do not usually get to take any practical subject. Some Single Science students may be able to take two practical subjects, like Agriculture and Home Economics, but this is not common.

*If it is the students who make the choice, it may happen that young students and poorly educated parents make decisions based on idiosyncratic criteria—perceived ease or difficulty of the subject, personality of the teacher, friendship group. These choices may turnout not to be in their best interests, neither for future studies nor in terms of work opportunities. If it is the school that makes the decision there may be a danger that the*
choice is made on the basis of teachers available rather than the students’ interests and relevance to the local community. (Lewin and Caillods, 2001:299).

**Gender balance**

The data was not available, but from observations on school visits it is clear that Agriculture is reasonably balanced, while Home Economics is favoured by females and Design and Technology by males.

**Staffing**

The situation in 2002 is presented in Tables 4 and 5. These tables are both unreliable, and do not reflect the total situation. There are not only temporary teachers available to teach practical subjects, teachers who are qualified to teach one or two subjects often teach another subject (like Computer Studies) because no one else is available. The Ministry of Education has been proactive in trying to recruit short-term contract teachers to fill vacancies: Design and Technology teachers from Zambia and Zimbabwe; Art teachers from Kenya and the UK; Commerce teachers from Ghana and Guyana; Home Economics teachers from Ethiopia, Ghana, Guyana and elsewhere; and so on.

The staff for junior schools are trained at the two colleges of education, Molepolole and Tonota (see for example an article on the training of Design and Technology teachers; Molwane, 1995). The University of Botswana has been training practical, subject staff for the senior schools, but only in Home Economics (all three subjects) and Design and Technology. Agriculture teachers are trained at the Botswana College of Agriculture and at the University of Swaziland. In the other subjects citizens who excel, following training at a College of Education, are often sent overseas to do bachelors and masters degrees. For example in Art to the California Institute of Design and then a Master of Arts in Teaching at Tufts. Design and Technology teachers have also gone to the UK because the University of Botswana’s output was considered too small. Some of these have also been sponsored by the Government to do masters. On their return a few of them have made excellent heads of practical subjects in senior schools.

The University has approved a BEd in Business Studies. This should, in the near future, begin to address the shortage of Commerce, Accounts and Business Studies teachers in the secondary schools.

Table 5 (even though it is not totally reliable) demonstrates that the dependence on expatriate teachers is minimal, as only five percent of (6,612 teachers) are found in the senior and seven and a half percent in the junior schools (the bottom row reading across). These 821 expatriate teachers are found to be mainly (445 of 821 or 54 percent) teaching academic subjects, particularly in the senior schools where two thirds are found there (for first subject taught). In the junior school we find a 14 percent reliance on non-citizens to teach practical courses (267 of 1905 teachers) compared to 27 percent in the senior schools (109 of 292 teachers).
Reliance on Expatriates Reduced

A comparison of Tables 3 and 4 shows that over the past decade the reliance on expatriates has been significantly reduced from nearly 50 percent in 1993 to 21 percent in 2002. Further reductions will occur during the next planning period as the output from the two colleges of education and university picks up.

Facilities for Practical Subjects

It has been noted above under “Status” the tremendous support given to the development and expansion of pre-vocational practical subjects by the Ministry of Education. Where there are problems (like the architects design of space for practical subjects) it can be traced to inadequate consultation and perhaps the assumption on the part of planners and decision makers that practical subjects can be taught in conventional classrooms that have been slightly adjusted (higher ceilings, improved ventilation, better storage, more power points, air-conditioning, and so on). For example Design and Technology rooms come with labels that contradict the integrated nature of the subject: separate rooms are still being built labeled “Woodwork”, “Metalwork”, “Plastics”, “Graphics” and so on. The concept of a large, multifaceted, multi-purpose workspace is missing. The space provided by the new buildings seems also not to recognize that so much of the teaching is one-to-one (the research, project design, project implementation, the development of the portfolio, and so on). As millions of Pula have been spent on the new buildings this lack of consultation or provision of what is really needed is frustrating to some staff.

Budgets for Practical Subjects

At the junior schools the practical subjects funds are allocated on a per-student basis, generally P55 for materials each year for each student. This is not found to be adequate, particularly in Art, Home Economics and Design and Technology.

    Budgets or “votes” for practical teaching materials differ from school to school at the senior level. Each school must submit plans and estimates, and then these must be defended. When the funds are allocated they are usually controlled by the Head, Practical Subjects, but may be passed on to the Coordinators to manage.

    For example at one school the votes are as follows: Agriculture, P27,600; Art, P22,000, Home Economics (all three subjects), P24,000; Computer Studies P30,000; Commerce, Accounts and all academic subjects draw from a “pool” of P686,700 (called “Student Books and Stationery”) while the Science laboratories get P33,900. In addition there is a vote of P31,500 for “out-of-school activities (excursions, which are an important part of practical subject teaching). Another example, the total for practical subjects (only four included) is P81,000, spread across Home Economics, P22,000; Design and Technology, P21,000; Art and Design, and Agriculture, P19,000 each.

    At another school, with a well developed farm, Agriculture gets P120,000 altogether in three votes (materials for student projects; livestock; agricultural tools and equipment). A tractor
was donated to the school, but when it broke down the school has been unable to find the resources to repair it and the Government has failed to replace it, even though a commitment was made to do so when the tractor was received). This compares to other senior schools where Agriculture only gets P30,000 for all three votes. The profit from all agricultural produce and livestock that schools produce and are sold goes to the Government, not to the schools (an accounting procedure found in the senior schools, not in the junior schools, which reflects a fear of mismanagement of funds or corruption, and a lack of trust in the school staff). There is also a vote for “Exhibitions”, something of particular interest to Art and Design and Technology teachers who want to see their students participate and compete in regional and national events. At some schools this vote had zero funds in it in 2002.

A rough attempt to estimate unit costs is presented in Table 8 (below). These include the annual cost of materials (votes), buildings and equipment per class, and the salary of one teacher for that class. Estimated average class size is given in column e., and unit cost estimates per ‘student place’ per annum is in the column to the right. It can be seen that English is the “cheapest” subject and Fashion and Fabrics the most expensive (about four times the cost of English).

Articulation between Junior and Senior Schools

There is very little contact between the schools. What articulation is achieved is caused by the process of selection of practical subjects in Form Four, and the structure of the syllabus between the two levels. When you are in junior schools staff complain that they wish more happened in primary schools to prepare their students for practical subjects. In the senior schools a similar complaint is made by staff about the standard and orientation to practical subjects achieved in the junior schools. They also claim that the independent study should begin in junior schools, that students should learn research skills at that level, that they should know how to go out into the community and find information. Students have great difficulty doing literature reviews, knowing how to cite sources and how to present quotations.

Table 8: Costs in Pula in one year for practical subjects compared to academic subjects [Cost per classroom based on depreciation over 50 years; for equipment ten years; for materials one year; salaries average for one teacher in each category without leave fares or gratuities].

<table>
<thead>
<tr>
<th>Subject</th>
<th>a. Classroom</th>
<th>b. Equipment</th>
<th>c. Materials</th>
<th>d. Salaries</th>
<th>e. (a+b+c+d)/e</th>
<th>No. Class</th>
<th>Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>4,800</td>
<td>4,000</td>
<td>1,000</td>
<td>57,304</td>
<td>40</td>
<td>1,677.60</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>4,800</td>
<td>4,000</td>
<td>1,000</td>
<td>65,021</td>
<td>40</td>
<td>1,870.52</td>
<td></td>
</tr>
<tr>
<td>Science Lab</td>
<td>9,543</td>
<td>10,000</td>
<td>2,000</td>
<td>57,801</td>
<td>35</td>
<td>2,266.97</td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td>Costs 2001-2002</td>
<td>Equipment</td>
<td>Materials</td>
<td>Teachers</td>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>----------------</td>
<td>-----------</td>
<td>-----------</td>
<td>----------</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>5,775</td>
<td>5,000</td>
<td>2,000</td>
<td>60,577</td>
<td>30</td>
<td>2,445.06</td>
<td></td>
</tr>
<tr>
<td>Design&amp;Tech</td>
<td>11,147</td>
<td>15,000</td>
<td>3,000</td>
<td>60,794</td>
<td>20</td>
<td>4,497.05</td>
<td></td>
</tr>
<tr>
<td><strong>Computer St.</strong></td>
<td>14,903</td>
<td>50,000</td>
<td>5,000</td>
<td>46,643</td>
<td>20</td>
<td>5,827.30</td>
<td></td>
</tr>
<tr>
<td>Food&amp;Nutrit.</td>
<td>10,279</td>
<td>10,000</td>
<td>4,000</td>
<td>59,095</td>
<td>16</td>
<td>5,210.87</td>
<td></td>
</tr>
<tr>
<td>Fashion&amp;Fab.</td>
<td>10,279</td>
<td>8,000</td>
<td>4,000</td>
<td>59,095</td>
<td>12</td>
<td>6,781.16</td>
<td></td>
</tr>
</tbody>
</table>

* Costs for the Ministry of Education administration of senior secondary schools has not been included.

** Computer laboratories are also used for computer awareness, but this has not been considered.

Assumptions:

a. Cost of new buildings in 2001-2002 as provided by the Ministry of Works divided by the number of classrooms and 50 years.
b. Estimated cost of equipment averaged for a classroom and divided by ten years.
c. Estimated annual costs of materials for a classroom for one year.
d. Teachers salaries calculated from data in Appendix 3 (number of teachers and senior secondary school salaries allocated for that category). These may be distorted by rank and status (for example computer studies is taught by new teachers who receive lower salaries). Teachers actually teach more than one class, so these figures can only give some rough idea of the relative unit costs for the different subjects (for example Fashion and Fabrics is approximately four times per student more costly than English).

**Integration Across Subjects**

One teacher said: “No integration; we do not work together; the core subjects are not reinforced in the practical subjects (or visa-versa)”. For example Art and Design works with textiles, so does Fashion and Fabrics, but they are different students and there is no communication between the staff and students, no in-service sessions, no sharing of ideas. In the new syllabus Fashion and Fabrics students are meant to develop “Mood Boards”, but the teachers seems not to know what these are and they don’t ask others (the Art teachers would be more familiar with these Eurocentric approaches in the syllabus). In Computer Studies the students do a fairy elaborate research project and write up their independent study. The theme of most Computer Studies projects involves a small business, yet (usually) none of these students are taking Commerce, and the Commerce students rarely learn from the Computer Studies students or get to use the computers that they use.

**All Teachers Exposed to Guidance and Counselling in Teachers’ Colleges**

The two Colleges of Education are meant to have introduced a six week, five hours a week, orientation to Guidance and Counselling for all teacher trainees being prepared to work in junior secondary schools. These “Guidance Awareness” sessions are scheduled at the start of the first term in the second year of a three-year programme just before teaching practice. Usually
only two weeks of the syllabus is covered as teaching practice intervenes. What has been missed is then not covered at a later date. This suggests that the Colleges do not take this aspect of their work seriously. At the university of Botswana there are a number of relevant courses offered by the Department of Educational Foundations.

**Guidance and Counselling**

Staff were asked if they were aware of which of their students wanted to make a career out of the practical subject they taught. Those who knew these students usually could refer to ones who wanted to become teachers of a practical subject. Only in Art and Design did a few teachers know of students who wanted to go further in art as a career, usually commercial art. They pointed out that their best students, who were interested in art, were also the best students in the school, excelling in English, Mathematics and the Pure Sciences. Because they were outstanding students they were open to careers in medicine, law, engineering and other disciplines and art would, if possible, become a hobby.

Teachers were critical of Guidance and Counselling in their schools. Career fairs, special sessions and what was taught in “G&C” seemed to constitute part of a euphoric picture that was presented to the best students so that they had the gift of choice when it came to their future careers. Little seemed to be done for the weaker students, except to admonish them to “work hard, do well, and then you will proceed”. It was said that there was too much emphasis on HIV/AIDS, safe sex, teenage pregnancy, and warning about the consequences of alcohol and drugs (all negative messages).

In 1999 the Ministry of Education commented on the problems associated with implementing the recommendations of the Revised National Policy in Education with respect to guidance and counselling (Ministry of Education, 1999: 28):

> Guidance and counselling is being strengthened in the schools to address the personal, social, educational and vocational/care needs of leavers. All students from primary to tertiary institutions are offered a comprehensive guidance and counselling programme that not only focuses on career guidance but also addresses the total person.

> The programme has been held back somewhat by a number of constraints. Implementation has been problematic because a lot of programme coordinators are still not training and the Guidance and Counselling Division does not have the complement of staff. Resources, especially resource and counselling rooms for guidance and counselling, are still lacking in schools ... due to the shortage of staff some schools do not offer comprehensive programmes since examinable subjects are given priority attention over guidance and counselling.

**In-service Training and Re-training**

This, as has been mentioned above, seemed to be absent from the schools. Instead a pattern has evolved over the years where teachers leave their school for workshops at regional Education Centres or at hotels. These workshops tended to be for only one to three days and the teachers claimed they were of limited value. They recommended the development of school-based in-service training programmes, particularly in the more difficult areas like student individual research and projects; articulation; integration across subjects; reinforcing of learning
in core subjects through practical subjects; career counselling; entrepreneurship and links to the world of work. The Ministry, to help correct these problems, has required the appointment of Staff Development Coordinators at each secondary school. In the future it is intended that these will be promotional positions and included financial incentives.

The changes in the syllabus and new methods of assessment require that those staff who are pursuing “best practices” share their knowledge with other teachers. It is the Design and Technology teachers who tend to excel in the new approaches. They should be used in regular school-based in-service training sessions. For example most teachers are used to seeing their students in a classroom and then taking their exercise books home to mark overnight. In Design and Technology this conventional approach no longer works. Instead teachers must work continuously with students after hours on a one-to-one basis. They also need to develop teamwork on the part of the students and team teaching by the teachers (again so best practice is communicated to others). Students in Design and Technology learn the skills of evaluating their own work at each stage and assessing the work of their peers. This also helps to free the staff to devote themselves to more creative and focused work with students on their individual projects.

In 1999 the Ministry of Education commented on the problems associated with implementing the recommendations of the Revised National Policy in Education with respect to in-service training (page 30):

> Junior and senior secondary in-service training is being merged to ensure that the needs of Basic Education are being met and to reduce overlap. Attempts are also being made to make this training more school based. To this end Staff Development Coordinators have been appointed in all schools.

**Clubs and Societies**

Most schools visited did not have any clubs or societies operating for any practical subjects. They usually said we used to have an “Art Club”, “D&T Club”, “Home Economics Club”, “Computer Club” or “Agricultural Club”, but not any more. They said they were too busy, were overworked, so had no time left for clubs. At the junior schools the staff are available in the afternoons to help students with their school work. At one senior school, where the head had blocked any intake into Form Four Art and Design, the two teachers had started an Art Club for the students who missed out on the subject. At another school the Design and Technology Club was the body that organized educational tours, like taking two bus loads of students to visit the Rural Industries Innovation Training Centre 600 km away in Kanye.

**Links to the “World of Work”**

These were minimal. The usual contacts outside the schools were through educational excursions to a mine, industry, museum or some focal point. I was told that funds had been curtailed and that they had not been able to make any trips so far this year.

One junior secondary head commented that: “Practical subjects at the junior secondary level are the fulfillment of requirements. The students who do not go on for further training then
idle in the community and do nothing”. Only with proper tracer studies of secondary school leavers would we know how valid this “received truth” is.

**Tracer Studies of Form Three and Form Five Leavers**

Though these are called for in the Revised National Policy on Education I was unable to learn of any that had been carried out so far and were also completed, presented to the Government, and accepted for dissemination. The “Tracer Study of Recent Labour Market Entrants” which was commissioned by the Ministry of Finance and Development Planning in 1997, has never been made public.

**Tertiary Entry and Recognition of Practical Subjects**

Practical subject staff in the schools had little knowledge of what was happening. Pastoral care departments would help students with their applications. But most students have left the secondary schools by the time they start applying for further training. When National Service (Tirelo Setshaba) existed they had a Guidance and Counselling section which was very active in assisting participants with their applications to tertiary institutions.

The Colleges of Education, though they receive thousands of applications for a few hundred places each, do try to take into consideration performance in a practical subject, so if a student is applying to do Art, Commerce, Design and Technology, or Home Economics they will consider their performance in these subjects. The best students who have excelled in Pure Science, Mathematics and English are unlikely to go to a College of Education, and if they have applied, they win a place elsewhere and do not usually accept their placement in a college of education.

At the Botswana College of Agriculture students applying to study in any field are assessed on their performance in the Sciences, English and Mathematics and little attention has been paid to the performance in Agriculture in Form Five, even for those prospective students who apply to become agriculture teachers in the schools. The College has been requested to reconsider this stance through the following communication:

> Last year 10,732 students took the examination (or 65 percent of the Form V students in the 27 senior schools). Of this group 6.3 percent earned an "A" (including "A*") or 672 students. This is certainly enough to merit some means of formal recognition in your selection process.

> To not formally recognize success in agriculture sends very negative messages about the subject you are meant to be leading the nation in. It also contradicts your mission to train agricultural teachers as it says their efforts are not worth recognition. Please reconsider your position on this. Yes, very few pure science students take agriculture, but I am sure there are double science students out there who do take agriculture and should be recognized.

> Maybe more pure science students would take agriculture if it was formally recognized in your selection criteria? (Communication from S.G. Weeks to the Dean, Botswana College of Agriculture, 23 May 2002)

The University of Botswana, Faculty of Engineering and Technology has a similar problem when it comes to Design and Technology and admission to the Faculty and specifically to study
to be a Design and Technology teacher in the senior schools. They have been requested to reconsider this stance through the following communication:

Of the 16,548 students taking the O’Level exams in the 27 senior school in 2001, only 3,671 (22.2%) took D&T. Of these 6.8 percent achieved an A* or A (249 students). It is impossible to know which of these did pure science versus double or single science. Altogether 25.1 % (920 students) got Bs and As. I understand MCE has a means of recognizing their performance (even though they admit only 300 out of 10,000 applicants). You should check with MCE on their admissions criteria.

Still if a “carrot” was held out to support the teaching of D&T in the schools (finding a way to consider D&T as part of the entry requirements for FET) this would be a significant development for the secondary education system in Botswana. Currently FET trains design and technology (D&T) teachers for senior secondary schools, but pronounces their work as irrelevant by ignoring it as a criteria for admission. D&T also doesn’t count if you want to become an engineer. Why not? (Communication from S.G. Weeks to the Dean, Faculty of Engineering, University of Botswana, 23 May 2002).

The Colleges of Technology, though they have a database on their admissions process, the database tends to report on prior performance in English, Mathematics and Science for applicants seeking admission from junior schools and senior schools. One college reported that they get 5,000 applications for a course with only 16 to 20 places. The Director of DVET reported 18,000 applications for 180 places across the six colleges. Further vocational training beyond junior and senior secondary school is obviously in high demand in Botswana.

The Technical Colleges now recognize that they could ask for specific and relevant prior training and include that information in their form (see Appendices). For example a course in Fashion and Design failed to ask for performance in Art (Art and Design) or Home Economics (Fashion and Fabrics). A course in Business Studies ignored relevant courses in Commerce and Business Studies in the junior and senior schools. Though it was felt interviews would explore these dimensions of the applicants, it was recognized that the “carrot” was missing and could easily be included in the application form.

**Cost of Running Secondary Education and Practical Subjects**

These are difficult to separate. In 2001/2002 (the fiscal year starts on April 1) it was estimated that P2,469 billion, or at P6.5 to the dollar, US $ 380 million, would be spent on education or 16.65% of a total expenditure of P14,833,944,910 or US$ 2,282 billion (Botswana, 2001: 3).

By March 31, 2001 P365,977,119 had been spent on secondary education (both junior and senior) which included P2,391,719 for practical subject materials. The budget for secondary for 2002/2003 has been increased to P435,965,870 of which P2,833,390 (or 0.65 percent) is for Practical Subjects materials. In addition to this under the Category “Special Expenditures” there are funds that will benefit different practical subjects as follows: Agricultural implements P64,070; Agricultural show stands, P21,760; Graphic Design Equipment, P250,000; Photographic equipment; Workshop equipment, P200,000; and Word processors and micro-computers P2,262,000 (a total of P2,797,830). Added to the above this more than doubles the allocation to practical subjects to P5,631,220.
With 153,593 secondary students in 2002 this equals P36.66 per pupil, which seems a pittance (and does not reflect the number of students in senior schools who may not take a practical subject). What confounds any attempt to distinguish between allocations for practical subjects and other subjects is the vote for “student books” which in 2002 is P17,079,210. It is not known how much of this goes to which group of students. If it was spread equally it comes to P111.20 per student. For Science across all 233 schools the vote for Laboratory equipment is P300,000 and Supplies an additional P472,160.

Because of the way accounts are kept both at the schools and at the Ministry of Education it has not been easy to establish the costs per student in the sciences compared to practical subjects. In Botswana it would appear that they are treated as equally as possible (the divergence is caused by lower student numbers in practical subjects). A consideration of line items (votes) suggest that the amount spent on practical skills, based on budgets, is only marginally higher than for academic subjects. The real difference in costs comes in class size. The organization of classes for academic subjects is between 35 and 40; while for practical subjects it is meant to be 17 to 20 (though Agriculture can have up to 30 to 35 in a class, and some Home Economics classes are as low as 10 students). An attempt was made in Table 8 on page 33 to calculate these costs. Though they are relative (and not totally accurate) the ratio between them is indicated: science is 1.35 more expensive than English; Agriculture 1.46; Design and Technology 2.69; Computer Studies 3.49; Food and Nutrition 3.12; and Fashion and Fabrics 4.06.

An assumption could be made that the per student costs for a practical subject are twice that of an academic subject, based solely on class size. The artificial “guestimates” could be made comparing the two groups. This has not been done as in Botswana the commitment to practical subjects (even if only two of eight or nine subjects examined) off-sets any argument that more students could be enrolled if only academic subjects were taught.

Secondary school salaries (all staff) are expected to consume P32,112,410 (Public Service salaries) and P290,263,572 (Teaching Service Management) in 2002/2003, or P1,889.82 per student. [This does not include gratuities and leave fares.] Botswana’s salary bill in proportion of the total budget is relatively low in comparison to other countries—for secondary it is only 44.2 percent. Even if the additional recurrent costs of teaching smaller classes for practical subjects could be calculated, in the context of what Botswana spends as a whole on education, it is marginal. In Botswana citizen and expatriate teachers receive nearly the same salary (expatriate tend to get more as they tend to occupy senior positions). The additional costs for employing expatriate staff lie in the gratuity (up to 30 percent, but taxable) and the cost of airfares to and from their home countries.

The cost per student of running the whole secondary school system in 2002/2003 is estimated to be P 4,728 (or MoE and PSM P435,965,870 plus TSM salary costs of P290,263,572 = P 726,229,442 divided by 153,593 secondary students)—because of devaluation and inflation this is not an increase in real terms from 1995/1996; see Table 9 below). With 6,612 teachers the crude cost per teacher comes to P109,835.
When separate costs for junior and senior have been available, senior secondary costs only marginally more.

Table 9: Comparative Unit Costs for Education (Pula, constant prices 1995/1996)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>501</td>
<td>552</td>
<td>826</td>
</tr>
<tr>
<td>Secondary (both)</td>
<td>2,299</td>
<td>2,744</td>
<td>-</td>
</tr>
<tr>
<td>Junior Secondary</td>
<td>-</td>
<td>2,537</td>
<td>1,860</td>
</tr>
<tr>
<td>Senior Secondary</td>
<td>-</td>
<td>3,282</td>
<td>2,200</td>
</tr>
<tr>
<td>Teacher Education*</td>
<td>4,567</td>
<td>6,447</td>
<td>7,850</td>
</tr>
<tr>
<td>Non-Formal</td>
<td>81</td>
<td>127</td>
<td>307</td>
</tr>
<tr>
<td>Brigades</td>
<td>3,139</td>
<td>3,264</td>
<td>5,265</td>
</tr>
<tr>
<td>Technical/Vocational</td>
<td>9,916</td>
<td>9,212</td>
<td>8,189</td>
</tr>
<tr>
<td>University of Botswana</td>
<td>25,352</td>
<td>24,955</td>
<td>17,374</td>
</tr>
</tbody>
</table>

Source: Botswana, 1997: 345
* TTC two year Certificate cost (the new three year Diploma in 1995/96 costs P8,420)

In NDP7 (1992 to 1997) P300 million was allocated for capital development in secondary schools. During the plan period over P600 million was actually devoted to development expenditure at this level (which was approximately two thirds of the budget and six times what the university received). The investment went to build four new senior secondary schools and to begin the expansion of the junior schools (both in number and to add Form Three and facilities for all six practical subjects). This priority to the development of secondary schooling has continued during NDP8. See Table 10 below:

Table 10: Comparative Planned Development Expenditure for Education (Pula, constant prices 1997/1998) During NDP8

<table>
<thead>
<tr>
<th>Function (Sub-sector)</th>
<th>Development Expenditure</th>
<th>Share Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>413,933,000</td>
<td>21</td>
</tr>
<tr>
<td>Secondary (both)</td>
<td>614,435,000</td>
<td>32</td>
</tr>
<tr>
<td>Teacher Education</td>
<td>176,200,000</td>
<td>9</td>
</tr>
<tr>
<td>Vocational Training</td>
<td>448,198,000</td>
<td>23</td>
</tr>
<tr>
<td>University of Botswana</td>
<td>204,917,000</td>
<td>11</td>
</tr>
<tr>
<td>Other *</td>
<td>74,015,000</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>1,931,698,000</td>
<td>100</td>
</tr>
</tbody>
</table>
Botswana spent P600 million on developing its secondary school facilities during NDP7 and will spend at least that much, but probably significantly more during NDP8. Assuming P1,600 million will be spent altogether over 12 years to create capacity for teaching 160,000 students, this averages P10,000 per student place or only US$1,538.

In the junior secondary schools the break down of capital expenditure in NDP8 was (Ministry of Education, 1999:30):

The programme involved the construction of 31 new community junior secondary schools and the extension of 172 schools that were already in existence. The estimated cost of the entire programme was P462 million. All schools have been provided with a computer room at a cost of P272,000 each. Schools with at least fifteen classes have been provided with a pavilion which can accommodate a full class for Design and Technology. Additional staff houses are being built so as to ensure that all junior secondary teachers are adequately housed.

P650 million was allocated for upgrading of government senior secondary schools and construction work is underway. Ultimately all the government schools at this level will be upgraded. Virtually all the facilities in the schools are achieving attention. The laboratories, classrooms, hostels, specialists rooms, staff quarters, administrative blocks, internal roads and street lighting will be improved. The absence of an intake into senior secondary schools in 1998 was used as an opportunity to ensure that essential facilities were in order for the increased intake in 1999 [Form Three went to the junior schools in 1998].

During NDP9 (20003-2009) at least four new senior secondary schools will be built and the expansion and development of the junior secondary schools will continue. This will build on the massive capital development inputs in NDP7. It is planned between 2003 and 2009 to spend 24.3 percent of the development budget for education on secondary schools, or an expenditure of P900 million (in 2002 prices). The annual recurrent budget for secondary will go up by 59 percent to P719 million. It is the intention of the Government to ensure that an education system is achieved that “will focus on providing programmes that will lead to higher quality of human capacity and productivity in leading to a better quality of life and prosperity for all”. (unpublished NDP9 planning document from the Ministry of Education).

Discussion

The key constraint operating against the development of practical subjects is the priority given to science subjects. Botswana, as in other countries, faces an inherent priority given to academic over practical subjects, and the prestige awarded science subjects is one example of this. Students are streamed into Pure Science subjects first, then Double Science, and finally Single Science (in 1992 it was called Combined Science).

The combinations open to the students who are perceived as being more capable and who take Pure Science do not usually leave time to take any practical subject on the final examination. The students who are deemed to be of lesser ability are then streamed into Single Science and have time to take some practical subjects (usually Agriculture plus one other). The
relationship then between taking a practical subject and a student’s perception of possible occupations is therefore limited.

One indicator that pre-vocational education, or the development of practical subjects in secondary schools, is perceived as being of low priority by others is the neglect of student performance in practical subjects by tertiary institutions. It is a topsy-turvy world: if a student wants to study agriculture in a tertiary institution they are best advised not to take agriculture in secondary school as admission to tertiary institutions is dependent on performance in English, Mathematics and the Sciences. Unfortunately the same observation applies to all other practical subjects, including Design and Technology, Principles of Accounts and Art and Design. Currently the six Technical Colleges do not ask specifically for prior performance in relevant practical subjects.

The lessons from Botswana in 1992 and 2002 concerning the development of practical subjects in secondary schools were partially encouraging. So far Botswana had avoided the problems faced in some other countries, by developing a form of pre-vocational education that has been ‘secondarized’ (the focus on research and problem solving as part of learning). The emphasis on pre-vocational, education is perhaps a blessing in disguise. There are no simple answers to the problems of the educational crisis faced by developing countries. Each country has to try to tailor its system to suit its own level of cultural, social, economic and technological development. It is possible to expose students to the world of work in a variety of ways: through clubs and societies, through carefully tailored and executed practical subjects, and through academic subjects where learning is related to the social and economic realities of the society. For example through English for job interviews, personal budgets, telephone skills, project planning, and dance and drama. Biology can be correlated to horticulture and poultry raising. Commerce can be linked to practical skills for living in communication, mathematics, accounts and English (with effective reinforcement of learning), and through running trial, demonstration ‘mini-enterprises’.

The problems identified in the Botswana case study demonstrate that even in a context where resources are relatively plentiful there exist a variety of problems which block the effective implementation of pre-vocational education. If pre-vocational skills and orientations are to be taught effectively, they require recognition of the constraints (teacher supply, qualifications, commitment, availability of materials, supplies, equipment and text books, resource books in the library, access to computers, and so on) and the development of strategies to remove the constraints. If this cannot be done, it is easier and simpler to focus on academic subjects. One problem which may negatively impact on the development of practical subjects may arise from the extensive borrowing from the United Kingdom of syllabus, approaches and text books that are now being used. Though relevant to the subjects and to Europe, they may not be relevant to Botswana and are already creating problems for students and teachers who do not fully comprehend the new syllabi.

To remove the constraints to the full development of practical subjects it is necessary to introduce relevant productive activities, promote integrated learning across subjects, develop teachers trained in management skills, establish links between school and community,
encourage leadership tuned to entrepreneurial activity, promote schools that are more exciting, viable institutions rather than mere academic factories, and to recognize that schools are microcosms of society—that schools consume and exchange goods and services.

Full vocationalization (the devotion of more than three to five hours a week to master a trade) of secondary schools is not possible in Botswana, nor has the government endorsed it, but more should and is being done to make the teaching of pre-vocational practical subjects effective. The route advocated by Mudariki, Education with Production, is the ideal, but whether it can ever become the reality in Botswana is still questionable (Mudariki, 1997; van Rensburg, 2001).

**Policy Issues and Constraints**

Botswana has invested heavily in developing practical subjects in both the junior and senior secondary schools. In the next two years the round of construction, which has particularly transformed the senior schools into “new” institutions, will be complete and fully operational. The provision of equipment (particularly computers for departments and sophisticated machinery for Design and Technology) will take longer. Botswana’s commitment to implementing its new syllabus and programmes in the practical subjects has required it to continue to import more teachers from outside the country. At the same time the system has moved with all deliberate speed to improve the training of teachers at the Colleges of Education and University of Botswana. New programmes to provide teachers, for example for Business Studies, have been developed and will be implemented.

The major lesson to be learned from Botswana is that where there are extensive resources available to throw at a problem, a great deal can be done; but at the same time more might have been done with less, if the system was better organized. One example of this is the provision of photography equipment (cameras, enlargers, film chemicals, paper and so on) to both junior and senior schools for Art and Art and Design, when the staff are not yet available who can teach the module. How much has been lost to theft and decay is not yet known. An opportunity was also lost to review the modules for photography when the syllabus was re-organized for the BGCSE—it is still antiquated, and the world-wide shift to “digital photography” is not in the syllabus.

It actually is not know what the “demand” is for practical subjects in the secondary schools. As it is a “requirement” in the junior schools, students must take Agriculture and one other practical subject drawn from Art, Business Studies, Design and Technology and Home Economics. It is not really a popularity contest between these offerings, but a balancing act between what the school can teach (for example not all junior schools can offer Business Studies or Computer Awareness) and the allocation of students to subjects (first, second, third or no choice).

Is Botswana continuing to be successful in preparing the school leaver for the world of work? Perhaps we should ask was Botswana ever successful in doing this? Certainly not at the junior schools, and perhaps not at the senior schools. Junior secondary leavers have limited opportunities available to them, and with qualification escalation these area shrinking in favour of
senior secondary leavers (Molema, 1995). The secondary schools in Botswana have not been vocationalized. Instead forms of “vocational preparation” or pre-vocational practical subjects have been developed and access to them expanded. In the absence of any tracer studies we do not know how much these courses have helped students to make career choices or prepared them for further training in Brigades, Vocational Training Centres and Technical Colleges. The staff who teach the practical courses believe that they have helped a minority of their students develop career aspirations and make choices for further training and employment.

The structure of the educational system in Botswana, specifically the return to the three year junior secondary school, has had unintended consequences which both the Commission in 1993 and the Government in 1994 were not conscious of (at least in their documents). The three year junior secondary with its provision of six generic approaches to practical subjects (Agriculture, Art, Business Studies, Computers, Design and Technology, Home Economics) is in the long run cheaper than the way options have been developed in the senior schools where they are more specialized.

The amount of time students may spend on practical subjects in the senior schools can still vary tremendously. A pure science student, who is taking one practical subject may be scheduled for only eleven percent of their time (or zero percent if they are taking no practical subject). It has been noted that the majority of students are now taking two practical subjects on the O’Level examination, which would account for 22 percent of their time (or if they were only taking eight instead of nine subjects, 25 percent).

Botswana has re-oriented its practical subjects towards and ethos of research, investigation, creative thinking and problem solving. Even Agriculture, which is usually the least expensive of the practical subjects, is taught this way in Botswana. It is recognized in Botswana that three to five hours a week on a practical subject will not usually lead to the mastery of that is required on-the job or in self employment. This is very different than in other countries where practical subject are “sold” to students and parents on the grounds that the will lead to employment, or if no jobs are available, at least to self-employment (King and McGrath, 1999; Lewin and Caillods, 2001). In Botswana the more “vocational” courses have been dropped from the syllabus (for example metalwork, woodwork and technical drawing).

Lewin and Caillods note on the teaching of practical subjects:

Where they are well organized, adequately resources and have carefully thought-out curricula complementing the other school subjects, they can make a value contribution to life after school. (2001: 301).

The Future

Pre-vocational preparation can be defined as a general education that combines knowledge, skills, values and attitudes in a form that prepares learners on how to investigate, develop and apply concepts learned in real life situations e.g: the home, community, recreational, social and work environments. Pre-vocational preparation should form a sound basis for further education and training. It should also stimulate innovativeness, problem solving and quality performance in a methodological manner in order to produce self confident learners who would in turn lead successful lives. (Ministry of Education, 1999:20).
After nearly a decade of work to implement the Revised National Policy on Education (Botswana, 1994; Ministry of Education, 1999), the nation remains committed to its experiment in promoting pre-vocational education instead of trying to vocationalize its secondary schools. In a few years from now the mix of new buildings, equipment, facilities and newer, younger and better trained teachers, will jell to bring about a qualitative change in Botswana's education system. The transformation of the nation's education system should occur during the next six years. There is a commitment to see that it is achieved during NDP9 (2003-2009). Whether the economy will grow and the absorption rate for school leavers expand at the same rate, is not yet known. But it is likely that Botswana has achieved 'an appropriate structural and institutional environment' to support pre-vocational education in secondary schools (Foster, 2002:28).

**Recommendations:**

**Issues for schools**

1. School-based In-service Training: This should be developed further, particularly for the new methods of teaching (student research and projects)—and be organized to learn from Design and Technology, where the staff have extensive experience.
2. All ten practical subjects should be under one Head of Practical Subjects.
3. Dropping of a practical subject by a school: This should not be happening, nor should it be justified on the grounds of previous poor examination results (schools would not teach Mathematics if this was really allowed).
4. Selling of practical subjects (particularly Design and Technology and Fashion and Fabrics): The image of these two subjects as "too difficult" needs to be overcome through various ways. This essential as these two subjects have the highest unit costs, caused by lower enrolments than expected and required.
5. Key skills: These need to be recognized and consciously incorporated into the teaching of practical subjects (as they are now in the Technical Colleges).

**Policy for MoE**

1. A clear statement on the philosophy of practical subjects: The reality is the shift to problem solving, research, individual projects in the new Botswana General Certificate of Secondary Education.
2. A clear policy on clubs for practical subjects so that they are supported and developed at all schools.
3. Further decentralization to schools to avoid the purchasing in advance of materials and equipment which will not be used (one example is the fiasco with darkrooms and photographic equipment in both junior and senior schools).
4. Equipping new buildings: demoralization of staff and students occurs when long delays happen—strategies to avoid delays of up to two years should be in place.
5. Incentives: each practical subject department should be allowed to manage its own accounts (monitored by the Head of Department practical subject and the Bursar).
6. A clear policy is required on Science and practical subjects (should Pure Science students be required to take at least one practical subject)?
7. Mathematics: The high failure rate might be dealt with by streaming in mathematics as in Science (a different Mathematics syllabus for single and double Science separate from triple (Pure Science): such a syllabus should be planned in conjunction with the requirements for Commerce/Business Studies.
8. Integration: This needs to be promoted between practical subjects where what they are doing overlaps, and between core academic subjects and practical subjects (so that
skills of Mathematics and English are reinforced by the practical subjects; and examples are taken from the practical subjects when teaching the core academics subjects.

9. Projects: Integration so students may be allowed to do one project for two subjects (if the student and teachers agree and the assessment procedures are appropriate).

10. Guidance and Counselling and practical subjects: Greater recognition of the needs of students who are taking practical subjects.

11. Tracer Studies: They are required (and must be budgeted for).

12. DVET students: More research is required so a picture is obtained on the relationship between achievement in both practical subjects and core academic courses and performance in colleges. Entrance standards and attainment in Colleges of Education and other DVET courses should be monitored.

13. Tertiary Admissions: The carrot of recognizing performance in practical subjects should be considered; and their results also included in application forms.

14. Primary Schools: The syllabi in Art and Agriculture should be reviewed so that it is comprehensive over all 12 years of schooling.
References


Davies, Martin (1985a) 'How is "industrial education" taught? Does the way it is taught promote its objectives?', In Practical Subjects in Kenyan Academic Secondary Schools: Background Papers. Education Division Documents No. 22. Stockholm: Swedish International Development Authority.


Appendix 1: List of People Interviewed

Maun Senior Secondary School
1. David Tregilges — Head
2. Ngope, S — HoD Practicals/Options (RE)
3. Mooketu, S. M. — HoD Pastoral
4. Donna Mangra— Coordinator, Business Studies
5. Montsisi, S. S. — Design and Technology
6. Dintwe, D. M. — Senior Teacher 1, Agriculture
7. Gupta, R. D. — Senior Teacher 1, Science
8. Gaborone, K. — Senior Teacher 1, Home Economics
9. Phuthego, M. N. — HoD Humanities
10. Razeek, M.L. M — Computer Studies
11. Morapedi, G. — Guidance and Counselling
12. Mawochi, M. — Coordinator, Religious Education

Lobatse Senior Secondary School
13. Ms Victoria Mphanyene— Headmistress
14. Richard Boitshwarelo — Deputy Head
15. Ronald Mocwakhumo — HoD Practical Subjects (D&T)
16. Serema, T. — Home Economics
17. Mgomezulu, M. — Unit Head, Agriculture
18. Maogo, P. — Unit Head, Art

Naledi Senior Secondary School
19. Mr H. M. Delwar— Deputy Head
20. Pofelo, O. N. — Home Economics
21. Eric Matshameko — Art and Design
22. Nelson Charles— Computer Studies
23. Lenyaola Kgwadi — Design and Technology
24. Joseph Kato — Agriculture
25. Ataora Amaniampong — Coordinator, Commerce
26. Victoria Annah — Commerce

St Josephs Secondary School
27. Mr Peter Choto,— Head
28. Constance Letsweletse — HoD Practical Subjects/Options (RE)
29. Boniface Makasa Kalubila — Computer Studies
30. Clyde Sibanda — Coordinator, Agriculture
31. Bernard Sekoto— Coordinator, Design and Technology
32. Linda Tirelo — HoD, Pastoral Care
33. Bunny Hirschfeldt — Coordinator, Home Economics
34. Ms Baloyi — Home Economics
35. Ms Lubinde — Home Economics
36. Ms Etsiba — Home Economics
37. Sebobi, Elizabeth— Coordinator, Art and Design

Mater Spei Secondary School
38. Fraser Tlhoiwe — Head
39. Felicitus Mosweu — HoD Practical Subjects/Options (HE)
40. Dolphin Mogomotsi — Computer Studies
41. John M. Mafwe — Coordinator, Agriculture
42. Jeramiso Rokwalo — Coordinator, Design and Technology
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<th>Name</th>
<th>Position</th>
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<td>Edward Fidler</td>
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<td>44.</td>
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<td>B. S. Dube</td>
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<td>45.</td>
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<td>46.</td>
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<td>Coordinator, Design and Technology</td>
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<td>50.</td>
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<td>Coordinator, Art and Design</td>
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<td>52.</td>
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<td>53.</td>
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<td>Coordinator, Commerce (under Humanities)</td>
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<td>54.</td>
<td>Peggy Roberts</td>
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<td>56.</td>
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<td>Sashe River Senior Secondary School</td>
<td>Mrs Osdina Maungandize</td>
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<td>58.</td>
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<td>72.</td>
<td>Michael Mphathiwa</td>
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<td>73.</td>
<td>Mr K. J. Gaolebale</td>
<td>Coordinator, Art and Design</td>
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<td>74.</td>
<td>Carlotta Gravesande</td>
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<td>75.</td>
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<td>Lotsane Senior Secondary School</td>
<td>Mr M. O. Mophuting</td>
<td>Head</td>
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<td>77.</td>
<td>Mr Senabwe</td>
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<td>78.</td>
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<td>79.</td>
<td>Herold Relaeng</td>
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<td>80.</td>
<td>Steve Harrison</td>
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<td>81.</td>
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<td>83.</td>
<td>Eleanor Bbaale</td>
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<td>Shoshong Senior Secondary School</td>
<td>Mr S. Mfole</td>
<td>Head</td>
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<td>85.</td>
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<td>86.</td>
<td>Mr Ngwako</td>
<td>Coordinator, Art and Design</td>
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Nanogang Community Junior Secondary School
88. Mrs J. Mawela — Head
89. Mr Coibi — HoD Practical Subjects/Options
90. Paul Motshegwe — Head, Guidance and Counselling
91. Siphila Mafefe — Design and Technology

Shangano Community Junior Secondary School
92. Martry Chebani — Head
93. Juvenille Kaoma — HoD Practical Subjects/Options (Art)
94. Sayini Matunya — Design and Technology
95. Kelennetse Mmereki — Commerce

Letlhabile Community Junior Secondary School
96. Mrs Modiege — HoD Practical Subjects/Options
97. Mrs Modikwa — Home Economics
98. Jairus N'Dakala — Art

Donga Community Junior Secondary School
99. Tabona Magaga — Head
100. Mrs J. Yeboah Deputy (Home Economics)

Rutwang Community Junior Secondary School
101. Obed Mbaakanyi — Head
102. Munaniki Malebye — Home Economics
103. Montsheki Mpotokwane — Art
104. Isaac Bowa — Commerce

Selepa Community Junior Secondary School (on a holiday)
105. Francis Chinyimba — Art (was there with students)

Patikwane Community Junior Secondary School
106. — Head (not available)
107. Mrs Koonne— HoD Practical Subjects/Options
108. Onalenna Kletgoetswe — Computer Awareness (20 computers)
109. — Commerce (not taught)
110. Colleen Mongwa — Art
111. Chibonta Mwiinga — Art

Shoshong Community Junior Secondary School
112. Maipelo Mazebedi — Head
113. Ms T. Ncube — HoD Pastoral/Guidance
114. Mr O. Oki — Computer Awareness (15, five stolen)
115. Mr D. Masoloko — Design and Technology

Ministry of Education
116. Reuben J. Motswakae — Director, Secondary Education
117. Jim Jones — Cambridge Syndicate, Consultant
118. Archibald S. Makgothi — Chief Education Officer, Planning, Statistics and Research
119. G. Marrow Mokoti — Principal Education Officer (Design and Technology)
120. Margaret Keitheile — Senior Education Officer (Research)
121. Monare Lecihiile — PEO (Development Services)
122. Mr K. Pitso — Teacher Service Management
123. Mr Kgokgwe — PEO (Information Technology)
124. Ms Gobesekeke — SEO (Planning)+
125. Mr John Moir Teaching Service Management
126. Ms M. Ngununu Director, Vocational Education and Training
<table>
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<th>No.</th>
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<td>127.</td>
<td>Mr Michael Kaetwa</td>
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<td>128.</td>
<td>Ismail Monkutlwatsi</td>
<td>Quantities Surveyor, Ministry of Works</td>
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Appendix 2: Secondary School Enrollments 1981 to 2002. Form One, Form Four and total

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### Appendix 3: TSM Salaries by Citizenship and School Type

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</table>

Total: 290263572
Appendix 4: Other materials originally submitted with this report, but not included in the present version

I. List of Photographs

The 25 pictures listed below are intended to convey a sense of the developments that have been taking place in both pre-vocational education in Botswana’s secondary schools and in the schools as a whole. Nearly all the older schools have been completely rebuilt in the last six years. Only a few remain to be completed (two because of the contractor absconding, others because the contractors are behind schedule). The photographs also give some understanding of both the spaces available and how the schools have been equipped.

School Facilities
1. New Design and Technology classrooms and laboratories on left, four new science laboratories in front, overhead walks, plus interior courtyards with natural light at Naledi Senior Secondary School.
2. Interior courtyard with students lockers on each side, Art and Design classrooms left and right (similar block behind) at Lobatse Senior Secondary School.
3. New Design and Technology block at McConnell Community College, Tutume.
4. “Careers Centre” for Guidance and Counselling (Pastoral care) staff at Maun Senior Secondary School.

Design and Technology
5. Display of past student Design and Technology Form Five projects at Maun Senior Secondary School.
6. Display of past student Design and Technology Form Five projects at Tutume (MCCC).

Agriculture
7. Students with their rabbits at Padikwane Community Junior Secondary School.
8. A student watering her plot at Padikwane Community Junior Secondary School
9. Student research plots at Maun Senior Secondary School (making compost).
10. Student plots and a chicken house under construction at Maun Senior Secondary School.

Home Economics
11. Facilities are well equipped in the new buildings—Fashion and Fabric students working on sewing machines at Tutume (MCCC).
12. Food and Nutrition class at Tutume (MCCC)
13. Home Economics class at a junior secondary school (fewer stoves, more students).
14. Home Management space in the new Home Economics block at Tutume (MCCC) —there is also a washing machine and dish dryer, but the architects had forgotten to plan for them. Older Home Management flats were self-contained, but at a few schools staff lived in them or used them as office and storage space. The open plan will prevent this from happening!

Computer Awareness/Computer Studies
15. One of the 206 junior secondary school computer laboratories waiting for its equipment (they were built in 1997 on, but only 51 have been supplied so far; by the end of 2002 all 206 junior schools will have at least 20 computers each and a massive in-service training programme on teaching computer awareness ill have been launched.
16. The equipment had recently arrived at Padikwane Community Junior Secondary School and the teacher, trained at Molepolole College of Education, is in place.

17. The new laboratory for Computer Studies and Computer Awareness at Naledi Senior Secondary School. It has two halves and space for 40 computers plus overhead project and other training facilities. The architects had forgotten blinds and a screen for projection/teaching.

18. New computer laboratory at Sashe River Senior Secondary School (the equipment had just arrived; a Commerce teacher tries it out).

Art and Design
19. A sketching class at Naledi Senior Secondary School (using old desks that have not been renovated).
22. More individual attention at Mater Spei Senior Secondary School

External spaces
23. Outdoor study in purpose-built space at a community junior secondary school.
25. Ministry of Education, Gaborone

II. Documents from Schools

Mater Spei College, Form IV, 2002, Subject Selection
Tutume McConnell Community College Subject Selection Form
Maun Secondary School, School Clubs
Lotsane Senior Secondary School Form 4 Choice Form
Nanogang Community Junior Secondary School, Choice of Options
2001 and 2000 Secondary School Examination Results