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ABSTRACT

Key competencies (or generic skills) have been specified in four sources: Further Education Unit (FEU), United Kingdom (1987); Finn Report (1991) and Mayer Committee (1992), Australia; U.S. Labor Secretary's Commission on Achieving Necessary Skills (SCANS) (June 1991); and Butterworth and Lovell (1983), New South Wales. A comparison of the four sources shows that each has elements in common and some that are different. Both SCANS and Butterworth/Lovell have based their development on empirical investigation and adjusted the data on the basis of a foundation of educational knowledge and practice. The FEU has had more experience in applying findings in curriculum design. A suggested composite model of key competencies adopts the SCANS concept of dividing key competencies into foundation skills and key competencies. Key competencies are recommended for use in a number of areas: work analyses, skills audits, curriculum design, development of teaching/learning strategies, assessment of learning and prior learning, and preparation for entry to the work force. Characteristics of a competency-based education system that have been identified are: careful definition of competencies, specification of standards and level expected, appropriate learning process, and graduate recognition. (Appendixes include the FEU key competencies, Butterworth/Lovell skill groupings and descriptions, and SCANS definitions of foundation and key competencies.) (YLB)

KEY COMPETENCIES

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KEY COMPETENCIES

CONTENTS

SYNOPSIS

Key competencies are sometimes described as core skills, or generic skills. This paper provides a comparison of key competencies specified in FINN and MAYER (AUSTRALIA), SCANS (U.S.A.), FEU (UNITED KINGDOM) AND TAFE (N.S.W.).

Key competencies are significant in determining what learning should occur to facilitate the entry of young persons to the workplace and to perform life roles. Inherent in key competencies are the concepts of skill application, and skill transfer to unfamiliar situations. A set of key competencies underpins all competent performances.

Two of the four key competency specifications fail to emphasize the importance of psycho-motor skills, their relationship to cognitive abilities and the physical fitness and propensity of the student, come worker. Ethics and ethical behaviour are also inadequately covered. Social issues are not adequately covered in the documents from the United States of America.

As a first step in defining educational and training needs with regard to key competencies it is suggested that the SCANS (U.S.A.) concept of dividing these into foundation skills and key competencies be adopted. There is a complex interplay among the skills and competencies. A proficiency scale that specifies the level of performance expected as an outcome of learning and experience is proposed in SCANS (preparatory, work ready, intermediate, advanced and specialist).

By using the SCANS key competency framework, omissions can be added from the various proposals to provide a more adequate specification and classification of key competencies. Knowing and classifying key competences provides a valuable tool for work analysis/skills audit and curriculum design.

The task in curriculum design is to translate key competencies into meaningful learning activities that are relevant, and able to motivate students, and that takes into account the individual student/worker's learning and immediate work needs, and propensities. This requires that the curriculum designer and the teachers be concerned both with the learning process and the outcomes of the program. Panaceas such as behavioural objectives, modular design, self pacing, mastery learning, pass/fail assessment are elements that might be considered (and possibly rejected) in structuring learning activities. The cost/benefit of the various alternative approaches should be evaluated as a significant factor in curriculum design and quality assurance for education and training. Course design and delivery needs to be flexible and adapted by the teacher to student/worker needs.

Key competencies and competency education implicitly require changes in curriculum design and teaching/learning methods involving study in context to ensure motivation and relevance, greater use of discovery and problem (issues) based learning, and flexibility in program delivery.

1. SKILLS TRANSFER IN VOCATIONAL EDUCATION

1.1 Vocational education seeks to enable the learner to perform tasks that are of immediate use in carrying out life roles at work and at home, as well as to adapt and transfer what has been learnt to new situations.

1.2 A set of key or core skills underpin all competent performances. These are generalisations, and form a class or cluster of specific skills that have a common value, theoretical or psycho-motor basis. They are sometimes called generic skills.

1.3 The concept of transfer of learning is central to all education and one vital function of competency-based education is to equip people with a range of knowledge, applied skills, understanding and attitudes which will prepare them to work in a context of change.

1.4 Transfer of learning does not occur automatically, and needs to be a planned element within the curriculum or human resource development plan. The student needs to see the potential for transfer, know the principles of transfer and have learning and performance strategies that enable that transfer to take place.

1.5 Competency education should be concerned with a holistic concept of competent people who can register achievement of "lots of competencies"[1]. The pre-occupation with skills broken down into their smallest constituent parts is a "Taylorist" concept. The ability to perform, to understand the context, logic and theoretical base of performance and the work situation, that makes an intelligent and competent worker. The ability to restructure acquired knowledge, skills and attitudes, and to make the best of one's own physical and mental attributes are the hallmarks of quality performance. Restructuring what has been learnt and achieved and adapting to changed circumstances arising from technology and social re-organisation are essential skills.

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1 White, Michael. Response to the Finn Report: Post-compulsory education and training in Australia. 1991. Page 4.

2. DEFINING KEY COMPETENCIES

2.1 Various lists of "key competencies", "core skills" or "generic skills" exist with a rationale to justify each competency specified in a given list. Although there is a general commonality about most of the stated key competencies (for example, communication, numeracy, problem solving, information technology, personal and interpersonal skills, attitudes to change), there are some differences and in some cases omissions. As would be expected some differences also occur in nomenclature and groupings of skills.

2.2 This document looks at key competencies suggested in four sources:

Further Education Unit[2], (FEU) UK, 1987;
Finn Report, 1991, and Mayer, 1992[3]
U.S. Labour Secretary's Commission on Achieving Necessary Skills (SCANS), June, 1991.[4]
Butterworth and Lovell[5], 1983.

2.3 The methodology of this paper is to compare these four sources of information, chart the similarities and differences and synthesize the information into a new schedule of foundation and key competencies. The uses of key competencies are considered and some concerns are articulated. The use of key competency concepts is advocated on the basis of the U.K. definition of competency.

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[2] United Kingdom. Department of Education and Service. Further Education Unit
Relevance, flexibility and competence.
FEU Publications, London, UK, 1987.

[3] Finn Report
Young people's participation in post-compulsory education and training. Report of the Australian Education Council Review Committee, AEC, Chairperson Brian Finn. Melbourne, 1991.

Mayer Committee
Employment-related key competencies: a proposal for consultation. Melbourne, May 1992.

[4] U.S.A. Department of Labor, Secretary's Commission on achieving necessary skills (SCANS) What work requires of schools. A SCANS Report for America 2000. Washington, June, 1991.

[5] Butterworth, Perce and Lovell, Eunice.
Classification by educational objectives: A manual for users N.S.W. Department of TAFE. Sydney, 1983.

3. FURTHER EDUCATION UNIT (UK) KEY COMPETENCIES

3.1 The Further Education Unit lists over one hundred core skills (FEU,ibid pages 28-38) which are described in terms of a range of experiences and competencies (includes skills, knowledge and attitudes) which they consider are necessary for an individual to make a success of adult life and to enhance job opportunities. These core competencies are broadly based, and capable of application in a variety of situations. They are grouped into ten areas:

- Personal and Career Development
- Industrial, Social and Environmental Studies
- Communication
- Social Skills
- Numeracy
- Science and Technology
- Information Technology
- Creative Development
- Practical Skills
- Problem Solving

3.2 Profiles of each area are detailed in the following extract from Relevance, flexibility and competence (1987) and are reproduced in Appendix A.

3.3 Most interesting in the Further Education Unit material is the way key competencies are transferred for use in curriculum design. In redesigning British engineering courses at all levels they have identified, used, and obtained industrially acceptance that "in generalised terms ...the primary processes of engineering are communicating, planning, implementing and appraisal." Similar, if not identical, processes may be identified in other vocational areas and indeed in life roles generally. The four processes are seldom identifiable as discrete activities; in any given task they are usually to be found in combination. A brief description follows:

"(i) Communicating. Includes finding and interpreting information and technical data; defining problems; reading drawings and diagrams; interacting effectively with other people and with quasi-intelligent devices; providing information in an appropriate form by oral and written methods, by drawings or sketches, and by demonstration.

(ii) Planning. Involves designing products, services and workplace layouts;

selecting tools and materials; task analysis; organising time and work; testing and evaluation. Enables the optimal use of resources within given constraints. Requires computational and estimating skills, an understanding of the principles of appropriate science and technology, the ability to order ideas and criteria logically and to set them out in diagrammatic form. The review of plans in response to progress, monitoring and appraisal is included. Planning activities extend the capacity of the participants in problem solving, creativity, discrimination and decision making.

(iii) Implementing. The process of 'doing' or carrying through a task, translating a plan (and its revisions) into an outcome which may be (for example) a product, report or presentation, or some personal accomplishment. An understanding of and practical skills in the use of appropriate tools, instruments and other equipment are needed, together with a knowledge of the requisite materials, science and systems. Implementing involves preparation, carrying out the task, and checking for completion, including clearing up. Implementing develops participants' ingenuity, persistence, reliability and teamwork skills.

(iv) Appraisal. Acquiring competence requires the ability to assess the adequacy with which objectives have been achieved. Self-appraisal should not be confused with external judgements required for accreditation purposes, although it may be associated with such assessments. Skills of measurement and testing and an understanding of monitoring processes and quality control may be required. In broader terms, a regard for the social, economic, political and environmental consequences of engineering activity is needed. The participants' capacity for judgement, self-awareness, self-criticism, discrimination and generalisation are reinforced.

It is suggested that the processes outlined above form the basis of competence in engineering occupations, and therefore underlie the competence-based curriculum[6]

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6 United Kingdom. Department of Education and Science. Further Education Unit. Core competencies in engineering, London, 1985, page 5-7.

3.4 The Further Education unit has gone further than anyone else in using key competencies in curriculum design. Their work has not been used in curriculum design work undertaken in Australia although it has been available for seven years.

3.5 The British approach is to look at an industrial sector as a whole; define key concepts and competencies that relate to the occupational area at all levels and in all sectors (for example trade, technical and professional levels in electrical, mechanical and civil engineering); and to give specific meaning to each key competency by specifying the inherent tasks, before applying these in a meaningful way for the learner, in the curriculum design.

3.6 It should be noted that the key competencies specified for a specific occupational cluster are formulated differently to those used in the ten key competency groupings. The tailoring of the key concepts and competencies to the specific nature of a given industrial sector is an important part of the curriculum design process. This process also explains the difference between a theoretical list of key competencies, and that derived by Lovell and Butterworth by the analysis of TAFE courses.

3.7 Because the Further Education Unit defines competence as "the possession and development of the skills, knowledge, attitudes and experience required for successful performance" they encompass in their key competencies the cognitive, affective and psy. o-motor domains. These domains are those identified by Bloom[7] in his Taxonomy of Educaitonal Objectives which in effect is a skills analysis of the learning process.

3.8 Both Finn and the subsequent work undertaken by the Mayer Committee,[8] in varying degrees, fail to address the affective and psycho-motor domains in the learning process.

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7 Bloom, Benjamin Samuel... Krathwohl, David R... Masia, Bertram B
Taxonomy of educational objectives: a classification of educational goals. Longmans, London 1956-1964.

8 Mayer Committee.

Employment-related key competencies. A proposal for consultation. Melbourne, 1992.

4. FINN REPORT AND MAYER COMMITTEE KEY COMPETENCIES

4.1 The Finn Report (1991) proposes that there are certain key competencies that all young people need to learn in their preparation for employment. The Mayer Committee was set up the Australian Education Council (AEC) and the Ministers responsible for Vocational Education, Employment and Training (MOVEET) to undertake further work on the employment-related Key Competencies concept contained in the Finn Report.

4.2 The Mayer discussion paper[9] described the benefits that might be gained from developing employment-related key competencies by way of the following objectives:

- To provide young people with better preparation for initial employment and a foundation for their continuing vocational education and training by identifying the competencies which are essential for participation in work and enabling all young people to develop these competencies regardless of the school or training pathway they follow in the immediate postcompulsory years.

- To contribute to the development of clearer and more flexible pathways between education, training and employment by establishing nationally-agreed standards of performance in the employment-related key competencies and nationally-consistent approaches to assessing and reporting on young people's achievements.

- To improve the capacity to report nationally on the outcomes of education and training to meet public accountability needs and to inform policy and program development and review.

4.3 The Mayer Committee adopted as their definition of competence one which recognises that performance is underpinned not only by skill but also by knowledge and understanding, and that competence involves both the ability to perform in a given context and the capacity to transfer knowledge and skills to new tasks and situations. (Page 4)

Employment- related Key Competencies according to Mayer are competencies which are essential for effective participation in work. They focus on the capacity to apply

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9 Mayer, Ibid, pages 2,4,5,8,9,44.

knowledge and skills in an integrated way in work situations. The Key Competencies are generic in that they apply to work generally rather than being specific to work in particular occupations or industries. This characteristic means that the competencies are not only essential for effective participation in work but are also essential for effective participation in other social settings. (Page 5)

4.4 FINN postulated that all young people should be able to develop these key competencies regardless of the education or training pathway that they follow. All post-compulsory education and training programs for the 15-19 age cohort should include within their overall expected outcomes, appropriate levels of competence in these six key knowledge and skill areas of:

- Language and communication
- Mathematics
- Scientific and technological understanding
- Cultural understanding
- Problem solving
- Personal and interpersonal.

4.5 If national standards for these key competencies are to be developed, then to facilitate this a framework has to be developed with a "profile" for each key competency to describe clearly its nature at a range of levels. This will allow educators in different education and training sectors to focus on the desired outcomes and develop curriculum and teaching approaches to suit. It will also allow a consistent approach to the assessment and reporting of young peoples' achievement in each of the key competency areas.

4.6 The FINN report notes that development of "profiles" for each of these "key competencies", (so that teachers and trainers can develop the required outcomes) will be a complex task. The initial efforts so far by the Mayer Committee are reproduced on the following 3 pages (pages 8,9 and 44 of the Mayer discussion paper).

It is proposed that there will be a single Key Competency Structure comprising a set of Key Competency Strands each of which will be described at a number of Performance Levels.

This section explains the proposed Key Competency Strands, including their relationship to the Key Areas of Competence, and the proposed number of Performance Levels and approach to defining the levels.

Appendix 5 contains notes on these proposals.

Key Competency Strands

Key Competency Strands are general descriptions of competencies which are essential for effective participation in work and other social settings. They focus on the capacity to apply knowledge and skills in an integrated way in work situations.

The proposed Key Competency Strands are as follows.

- **Collecting, analysing and organising ideas and information**
  This strand focuses on processes for gathering, evaluating and presenting ideas and information for a range of practical purposes.
- **Expressing ideas and information**
  This strand focuses on the capacity to use a range of forms of communication, oral, written and graphic, to communicate ideas and information effectively to others.
- **Planning and organising activities**
  This strand focuses on planning, organisation and self-management. It includes the capacity to complete a task, with some degree of independence, monitoring one's own performance and ensuring effective communication, reporting and recording of processes and outcomes.
- **Working with others and in teams**
  This strand focuses on processes of working with others and working in teams, including setting common goals, deciding on the allocation of tasks, monitoring achievement of the goals and checking the quality of the final product.
- **Using mathematical ideas and techniques**
  This strand focuses on the capacity to select, apply and use mathematical ideas and techniques to complete tasks in a wide range of contexts.
- **Solving problems**
  This strand focuses on problem solving as a process. Problem solving is defined broadly to include identifying and framing the nature of problems and devising suitable strategies of response.
- **Using technology**
  This strand focuses on the capacity to use technological processes, systems, equipment and materials and the capacity to transfer knowledge and skills to new situations.

Key Areas of Competence

The Key Competency Strands have been drawn from the Key Areas of Competence recommended in the Finn Report. These are as follows.

Language and Communication

This area includes knowledge and skills related to:

- speaking
- listening
- reading
- writing
- accessing and using information.

Using Mathematics

This area includes knowledge and skills related to:

- computation
- measurement
- understanding mathematical symbols.

Scientific and Technological Understanding

This area includes knowledge and skills related to:

- understanding scientific and technological concepts
- understanding the impact of science and technology on society
- scientific and technological skills, including computing skills.

Cultural Understanding

This area includes knowledge and skills related to:

- understanding and knowledge of Australia's historical, geographical and political context
- understanding of major global issues; e.g. competing environmental, technological and social priorities
- understanding of the world of work, its importance and requirements.

Problem Solving

This area includes knowledge and skills related to:

- analysis
- critical thinking
- decision making
- creative thinking
- skills transfer to new contexts.

Personal and Interpersonal

This area includes knowledge and skills related to:

- personal management and planning, including career planning
- negotiating and team skills
- initiative and leadership
- adaptability to change
- self esteem
- ethics.

Relationship between the Key Competency Strands and the Key Areas

The integrated and applied nature of the Key Competency Strands means that there is not a simple one-to-one relationship between a particular strand and a Key Area.

Collecting, analysing and organising ideas and information, for example, was identified initially as a Key Competency Strand drawn from the Language and Communication area. As development has proceeded, it has become evident that this strand also draws to some extent on knowledge and skills of the Cultural Understanding, Problem Solving and the Personal and Interpersonal areas. Furthermore, depending on the context, Collecting, analysing and organising ideas and information may also involve ideas and information drawn from the areas of Using Mathematics and Scientific and Technological Understanding.

Similarly, Using mathematical ideas and techniques was drawn initially from the area of Using Mathematics. However, competence in Using mathematical ideas and techniques involves more than the application of knowledge and skills of Using Mathematics. It also requires use of some knowledge and skills drawn from the Language and Communication, Cultural Understanding, Problem Solving and Personal and Interpersonal areas. Again, depending on the context, it may also involve applying knowledge and skills drawn from the area of Scientific and Technological Understanding.

In other words, while each strand was identified initially through examination of one of the Key Areas of Competence, it has become apparent that each of the strands draws to some extent on knowledge and skills of all of the Key Areas.

The following table illustrates the way the Committee expects these relationships will emerge for each of the proposed Key Competency Strands

Summary of the proposed set of Key Competency Strands

Key Competency Strand / Performance Level	Performance Level 1	Performance Level 2	Performance Level 3
Collecting, analysing and organising ideas and information	Access and record pieces of information from a single source	Access, select and organise information from more than one source	Access, evaluate and organise information from a range of sources
Expressing ideas and information	Express routine ideas and information in familiar situations	Express complex ideas and information in familiar situations	Express complex ideas and information in unpredictable or unfamiliar situatons
Planning and organising activities	Plan and organise a routine activity under supervision	With guidance, plan and organise a complex activity	Initiate, perform, and evaluate a complex activity independently
Working with others and in teams	Work with others to undertake familiar activities	Help formulate and achieve group goals	Collaborate with others to complete complex activities
Using mathematical ideas and techniques	Use mathematical ideas and techniques for completing simple tasks in familiar situations	Select and use mathematical ideas and techniques for completing complex tasks	Evaluate, adapt and use mathematical ideas and techniques in completing tasks
Solving problems	Solve routine problems with minimal supervision or tackle exploratory problems with close supervision	Solve routine problems without supervision and exploratory problems with some guidance	Implement a systematic approach to the solving of complex problems and explain processes used
Using technology	Reproduce or present a basic product or service	Construct, organise or operate products or services	Design or tailor products or services

5. BUTTERWORTH & LOVELL KEY COMPETENCIES

5.1 A further example of key competencies and potential generic learning areas is provided by Butterworth and Lovell (1983) in their well researched classification of the objectives of TAFE courses. They identified some thirty eight key competencies which they have grouped under eleven major areas. This empirical study uses the key competencies to scale the educational and vocational make up of a given course.

5.2 Appendix B provides more detail of the eleven groupings and descriptions of the educational objectives which further illustrate the logic of the classification. The work itself goes further to provide a scale for measuring the existence of each generic skill or attribute, and provides a computer program for printing out comparative histograms for each course.

5.3 This work evaluates the cognitive, affective and psycho-motor (knowledge, values and manipulative) aspects of competency.

5.4 This research was used as a guide in establishing the current national classification of TAFE awards granted for courses Australia wide. It has permitted the comparison of courses in dissimilar fields to establish whether the purpose, scope, depth and breadth warranted a certain level of recognition such as Certificate, Advanced Certificate, Associate Diploma or Diploma. Evaluation is based on a program's educational aims, objectives and competencies derived rather than such factors as duration or "time served".

5.5 However, it is equally useful as a statement of key competencies derived empirically by an investigation of hundreds of vocational courses designed on the basis of industry work analyses with industry review prior to accreditation.

CLASSIFICATION OF EDUCATIONAL OBJECTIVES

BUTTERWORTH/LOVELL	No.	Objective Name
A. Motor Skills	1	Discriminatory Skills
	2	Skilled Movements
	3	Motor/Routine Skills
B. Tools, Equipment, etc.	4	Set, Position, Operate
	5	Numerically Control
	6	Tend/Monitor - Instruments
	7	Testing, Diagnosing
C. Construction, etc.	8	Construction/Workshop Skills
	9	Mixing Processes
	10	Service, Maintain, Repair
D. Mathematical Base	11	Mathematics, Measurement
	12	Hand/Machine Drawing Skills
	13	Physical/Financial Estimation
	14	Accounting/Auditing
E. Servicing	15	Establishing Needs
	16	Clerical Skills
F. Management	17	Advisory Skills
	18	Selling Skills
	19	Educational Skills
	20	Caring/Welfare Skills
	21	General Management
G. Industry	22	New Technologies
	23	External Evaluation
	24	Safety and Health
	25	Industrial System
H. Communication	26	Non-Discursive Communication
	27	Written Communication
	28	Oral Communication
	29	Creative Skills
I. Social	30	Social Content
	31	Individual and Work
J. Cognitive	32	Knowledge - Universals
	33	Knowledge - Analysis
	34	Knowledge - Synthesis
	35	Study and Learning Transfer
K. Depth	36	Practical Skills
	37	Knowledge
	38	Attitude

6. U.S. LABOR SECRETARY'S KEY COMPETENCIES

6.1 *The purpose of SCANS*[1]

The U.S. Labor Secretary's Commission on Achieving Necessary Skills (SCANS) was established to examine changes in the workplace and the implication of those changes for learning. SCANS was charged with the task of:

- Defining the skills needed for employment;
- Specifying acceptable levels of proficiency;
- Suggesting effective ways to assess proficiency and ...
- Development of a dissemination strategy.

6.2 *Characteristics of work and school*

The report specifies two conditions that have arisen in the last quarter of the 20th Century that have changed the terms for entry into, and participation in, the world of work and life roles. These are the globalization of commerce and industry, and the explosive growth of electronic and information technology. SCANS maps the social implications of this in two charts of the characteristics of today's and tomorrow's workplace, and of today's and tomorrow's schools (see page 17). Curiously this statement of social impact is not reflected adequately in the satement of SCANS Key Competencies.

6.3 *Generic competencies and a foundation*

SCANS research came up with a concept of "workplace know-how" that has two elements: competencies and a foundation. They identified five generic competencies and a three-part foundation of skills that is alleged to be at the heart of work performance. The competencies and the foundation should be taught and understood in an integrated fashion that reflects the work contexts in which they are applied.

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1 U.S. Department of Labor. The Secretary's Commission on achieving necessary skills. What work requires of schools: A SCANS report for America 2000. Washington, June 1991.

CHARACTERISTICS OF TODAY'S AND TOMORROW'S WORKPLACE[1]

TRADITIONAL MODEL	HIGH PERFORMANCE MODEL
STRATEGY	
• mass production	• flexible production
• long production runs	• customized production
• centralized control	• decentralized control
PRODUCTION	
• fixed automation	• flexible automation
• end-of-line quality control	• on-line quality control
• fragmentation of tasks	• work teams, multi-skilled workers
• authority vested in supervisor	• authority delegated to worker
HIRING AND HUMAN RESOURCES	
• labor-management confrontation	• labor-management cooperation
• minimal qualifications accepted	• screening for basic skills abilities
• workers as a cost	• workforce as an investment
JOB LADDERS	
• internal labor market	• limited internal labor market
• advancement by seniority	• advancement by certified skills
TRAINING	
• minimal for production workers	• training sessions for everyone
• specialized for craft workers	• broader skills sought

Source: "Competing in the New International Economy." Washington: Office of Technology Assessment, 1990.

CHARACTERISTICS OF TODAY'S AND TOMORROW'S SCHOOLS

SCHOOLS OF TODAY	SCHOOLS OF TOMORROW
STRATEGY	
• Focus on development of basic skills	• Focus on development of thinking skills
• Testing separate from teaching	• Assessment integral to teaching
LEARNING ENVIRONMENT	
• Recitation and recall from short-term memory	• Students actively construct knowledge for themselves
• Students work as individuals	• Cooperative problem solving
• Hierarchically sequenced—basics before higher order	• Skills learned in context of real problems
MANAGEMENT	
• Supervision by administration	• Learner-centered, teacher directed
OUTCOME	
• Only some students learn to think	• All students learn to think

The SCANS competencies and skills are not intended for special tracks labelled "general" or "career" or "vocational" education. They ought to be an integral part of the study of a discipline such as history or theoretical science as well as the basis of specifically vocational education and training. The common ground is that learning is both "to know" and "to do" and is undertaken in context.

6.4 *Principles of contextual learning*

SCAN devotes section III of its report to the implications of key competencies for learning. Its main theme is that learning must be relevant and this, can best be achieved by learning occuring in the context of where it is needed.

The principles of this proposed "contextual" learning are that:

- It is part of life long learning.
- The generic competencies and the foundation underpin all work and learning endeavours and therefore must be part of all curriculum. It should be overt and not hidden.
- The most effective learning occurs in context. This can be achieved by placing the learning objectives within a real environment rather than expecting that students will learn in the abstract and then be able to apply this abstract learning.
- Learning should be orientated towards encouraging students to recognise and solve problems rather than the mere mastery of information.
- Students do not need to learn basic skills before they learn problem solving skills. The two go together. They are not sequential but mutually reinforcing.
- The foundation and generic competencies cannot be taught in isolation; students need practice in the application of these skills.
- Personal characteristics such as self-esteem and responsibility, for example, are best developed in team work efforts.
- Knowledge and its uses belong together and this is crucial in students being motivated and seeing the schooling as being relevant to their needs.

FIVE COMPETENCIES

Resources: Identifies, organizes, plans, and allocates resources

A. *Time*—Selects goal-relevant activities, ranks them, allocates time, and prepares and follows schedules
B. *Money*—Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives
C. *Material and Facilities*—Acquires, stores, allocates, and uses materials or space efficiently
D. *Human Resources*—Assesses skills and distributes work accordingly, evaluates performance and provides feedback

Interpersonal: Works with others

A. *Participates as Member of a Team*—contributes to group effort
B. *Teaches Others New Skills*
C. *Serves Clients/Customers*—works to satisfy customers' expectations
D *Exercises Leadership*—communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies
E. *Negotiates*—works toward agreements involving exchange of resources, resolves divergent interests
F. *Works with Diversity*—works well with men and women from diverse backgrounds

Information: Acquires and uses information

A. *Acquires and Evaluates Information*
B. *Organizes and Maintains Information*
C. *Interprets and Communicates Information*
D. *Uses Computers to Process Information*

Systems: Understands complex inter-relationships

A. *Understands Systems*—knows how social, organizational, and technological systems work and operates effectively with them
B. *Monitors and Corrects Performance*—distinguishes trends, predicts impacts on system operations, diagnoses deviations in systems' performance and corrects malfunctions
C. *Improves or Designs Systems*—suggests modifications to existing systems and develops new or alternative systems to improve performance

Technology: Works with a variety of technologies

A. *Selects Technology*—chooses procedures, tools or equipment including computers and related technologies
B. *Applies Technology to Task*—Understands overall intent and proper procedures for setup and operation of equipment
C. *Maintains and Troubleshoots Equipment*—Prevents, identifies, or solves problems with equipment, including computers and other technologies

A THREE-PART FOUNDATION

Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks

A. *Reading*—locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules
B. *Writing*—communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts
C. *Arithmetic/Mathematics*—performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques
D. *Listening*—receives, attends to, interprets, and responds to verbal messages and other cues
E. *Speaking*—organizes ideas and communicates orally

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons

A. *Creative Thinking*—generates new ideas
B. *Decision Making*—specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative
C. *Problem Solving*—recognizes problems and devises and implements plan of action
D. *Seeing Things in the Mind's Eye*—organizes, and processes symbols, pictures, graphs, objects, and other information
E. *Knowing How to Learn*—uses efficient learning techniques to acquire and apply new knowledge and skills
F. *Reasoning*—discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty

A. *Responsibility*—exerts a high level of effort and perseveres towards goal attainment
B. *Self-Esteem*—believes in own self-worth and maintains a positive view of self
C. *Sociability*—demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings
D. *Self-Management*—assesses self accurately, sets personal goals, monitors progress, and exhibits self-control
E. *Integrity/Honesty*—chooses ethical courses of action

- Assessment should be continuous and of the integrated whole. Competent performance assumes a host of individual skills and should demonstrate that the learner has grasped the foundation skills.

- The assessment process must be aimed at ensuring fairness for students from different social, racial and economic backgrounds.

- The performance criteria for the assessment system must be crystal clear. Assessments must be designed so that when teachers teach and students study, "both are engaged in authentic practice of valued competencies".

6.5 *Proficiency Levels*

SCANS proposes a grading of learning into different levels of proficiency. By way of example just one area of competence - managing time as a resource - the proficiency scale might look like the following:

Proficiency level	Performance Benchmark
Preparatory	Scheduling oneself
Work-ready	Scheduling small work team
Intermediate	Scheduling a production line or substantial construction project
Advanced	Developing roll-out schedule for new product or production plant
Specialist	Develop algorithm for scheduling airline

More specific examples are given of the "work-ready" level in the service and manufacturing industries in the following charts.

SERVICE KNOW-HOW: LEVEL OF COMPETENCE EXPECTED FOR ENTRY ON A CAREER LADDER

(See Accommodations and Personal Services Scenario, Chapter II)

COMPETENCE	EXAMPLE OF WORK-READY LEVEL
RESOURCES	Develop cost estimates and write proposals to justify the expense of replacing kitchen equipment. Develop a schedule for equipment delivery to avoid closing restaurant. Read construction blueprints and manufacturers' installation requirements to place and install equipment in the kitchen.
INTERPERSONAL	Participate in team-training and problem-solving session with multicultural staff of waiters and waitresses. Focus on an upcoming Saturday night when a local club has reserved the restaurant after midnight for a party. Three people cannot work and the team has to address the staffing problem and prepare for handling possible complaints about prices, food quality, or service.
INFORMATION	Learn how to use a spreadsheet program to estimate the food costs of alternative menus and daily specials. Make up weekly menu and print it with desk-top publishing software.
SYSTEMS	Analyze "system" that determines the average and maximum wait from the time customers sit down until they receive the appetizer and then the entree. Modify system to reduce both the average and maximum waiting time by 20 percent. Determine expected increase in the number of customers served.
TECHNOLOGY	Read the specifications and listen to salespeople describe three competing ovens for the kitchen. Write a report evaluating the ovens and making a recommendation. Set the automatic controls on the chosen oven to prepare a sample dish.

MANUFACTURING KNOW HOW: LEVEL OF COMPETENCE EXPECTED FOR ENTRY ON A CAREER LADDER

(See Manufacturing Scenario, Chapter II)

COMPETENCE	EXAMPLE OF WORK-READY LEVEL
RESOURCES	Develop a plan to show how the production schedule can be maintained while the staff is trained in a new procedure. Estimate the number of additional employees or overtime required so that training can occur. Prepare charts to explain schedule to management and employees; make a presentation and answer questions about it.
INTERPERSONAL	Join a production team brainstorming to find ways to include two new workers who speak limited English in the plant's improvement program. The goal is to have all team members, whatever their English skills, make weekly suggestions to improve product quality.
INFORMATION	Analyze statistical control charts to monitor error rate. Develop, with other team members, a way to bring performance in your production line up to that of best practice in competing plants.
SYSTEMS	As part of information analysis above, analyze painting system and suggest how improvements can be made to minimize system downtime and improve paint finish.
TECHNOLOGY	Evaluate three new paint spray guns from the point of view of costs, health and safety, and speed. Vendors describe performance with charts and written specifications. Call vendors' representatives to clarify claims and seek the names of others using their equipment. Call and interview references before preparing a report on the spray guns and making a presentation to management.

Implicit in the changes in the education system are changes in work systems. The interim report states:

> "It makes no sense for schools to teach self-management if employers want to vest all authority in supervisors. Speaking skills will atrophy if workers are only expected to listen. Traditional mass production factories often viewed creativity as a liability rather than as an asset in a worker; and they certainly did not need workers who could 'challenge existing procedures'. Understanding systems yields no advantage if tasks are fragmented. Knowing how to schedule is an unnecessary skill if workers are subject to the routine of the traditional production lines." (page 24)

6.7 *The definition of key competencies*

The classification of competencies into foundation and key competencies that are integrated and portrayed in the industrial context is a useful strategy. The vehicle for delivery is problem based teaching/learning. It is directly counter to the view that you split skills into minutely defined components and present these in sequences to form a training program. In SCANS, proposed assessment is continuous and of the synthesis of competencies in life situations, not of each minute component.

SCANS has chosen to interpret the industrial information collected and its analysis in a certain way to come to its definition of key competencies. Some omissions are of interest.

SCANS places great emphasis on problem solving with only passing interest in creativity. It seems to assume creativity is problem solving, rather than problem solving being a sub-class of the creative process. Since innovation, design and style are fundamental to our cultures, the omission is curious. Its implications in product and service design, graphics, theatre, music and the arts should make it a natural candidate and of primary importance as a key competency for all levels of work and education. That it is not emphasized adequately in present education programs is all the more reason for its inclusion.

Motor skills as a generic concept is neglected by many managers and academics. Human movement is fundamental to any physical performance whether it be in sport, theatre, dance, physical work or manipulative activities. It encompasses such issues as anatomy and physiology, capacities, fitness, strategy, breathing, stress control, timing, conservation of energy, safety and health. It includes the whole spectrum of sensory perception and how it can be used to enhance performance. It is in the area of motor skills that a large component of skills transfer occurs. This skill might be added to SCANS foundation skills under the heading of physical fitness. The foundation skills would then become Basic skills, Thinking skills, Personal qualities, Physical skills. As it stands at present, it is not assumed in basic skills or personal qualities, so it therefore needs to be a separate category.

SCANS does not provide an adequate treatment of social and environmental issues. Definitions of the competencies are reprinted in Appendix C.

7. WHAT CAN WE LEARN FROM DIFFERENT APPROACHES TO KEY COMPETENCIES?

7.1 Each expression of key competencies has elements in common, and some that are different. It is an interesting exercise to develop a best model using the elements from each attempt at definition. Both SCANS and Butterworth/Lovell have based their development on empirical investigation and adjusted the data on the basis of a foundation of educational knowledge and practice. The FEU specification pre-dates the others and they have had more experience in applying their findings in curriculum design.

7.2 In organising a specification the following factors would seem to be useful or important:

- A separation be made between foundation skills and key competencies. Foundation skills are required to effectively carry out key competencies in complex work situations. The foundation skills will however be a reflection of the key competencies, albeit at a very basic level.

- Recognition that the categories in any classification are not mutually exclusive. That complex performances will involve a combination of the key areas.

- A classification similar to that used in SCANS should be adopted because it provides an organisational logic derived from a work analysis of the major industrial sectors of the economy.

- Better logical connections need to be made between some of the elements in the classifications of key competencies. For example, information gathering should be linked to communication since one has to have something to communicate. Problem solving should not be confused with creativity.

- Key competencies in vocational education and training must cover the three domains of the cognitive, affective and the psychomotor; since all are important for competent work performance.

- A realization that key competency defined in a classification will change in form (but not in essence) when applied to a particular industrial area. For example, the FEU with full industry support has identified the key competencies of all engineering activities as being communication, planning, implementation and appraisal.

- There is no right and wrong classification format, since how you classify is determined by the purpose for which it is to be used. However, some classifications are more complete and/or useful than others.

- The purpose for which the classification of key competencies is to be used, needs to be carefully defined, since this in turn will permit evaluation.

- Competency concepts in education do not exclude discipline studies, and each may be part of the other.

- That quality assurance is process based, and therefore both outcomes and processes are important considerations in work and learning competence.

7.3 Accordingly the following composite model of key competencies is presented for consideration as an improvement on those previously available. It comprise of two parts:

Part I - Foundation skills concerned with the development of the cognitive, psychomotor and affective skills as a basis for wider participation in work and learning (page 25).

Part II - Key competencies needed in a full spectrum of life roles including work in specific vocations (Pages 26 and 27).

FOUNDATION SKILLS

KEY SKILL / QUALITY	SCOPE / DESCRIPTION
BASIC COGNITIVE SKILLS	• Accessing and recording information from various everyday sources • Listening, and expressing ideas and information, based on everyday needs and events • Use of elementary mathematical ideas and techniques to meet everyday needs • Numerical concepts and measurement • Basic conceptualisation, reasoning and problem solving • Exploration and creativity (appreciation and application) • Knowing how work gets done • Knowing how to learn • Evaluation of basic performances • Setting objectives and having a strategy
BASIC MANIPULATIVE SKILLS AND ERGONOMICS	• Planning and organising an activity • Assessing one's physical capacities and its enhancement: - Physiology and psychology - Fitness and capacity - Sensory perception - Special capacities - Discrimination / matching skills - Spacial concepts and skills - Goals and confidence - Warm up and breathing - Skilled movements, rhythm and co-ordination • Materials and their properties • Energy sources and work • Tools and their safe use • Carrying out practical activities - communication and interpretation - drawing skills - hand skills - machine skills (set, position, operate) - location and measurement - mixing skills - construction and fabrication skills - service, maintenance and repair skills - testing and diagnosis - quality / evaluation • Finishing a practical activity • Creativity and problem solving • Standards and expectations • Evaluation, modification and improvement of performance • Individual and team work • Co-operation and co-ordination in performance • Health and safety • First aid • Total performance and quality assurance
PERSONAL QUALITIES AND THEIR DEVELOPMENT	• Appearance and how perceived by others • Physical attributes • Psychological attributes • Social and cultural attributes • Disabilities • Self assessment and self esteem • Hygiene • Attitudes • Responsibility • Position, role and influence • Social ability • Self management • Being oneself, style, change and development • Group influences • Identity and social acceptance • Tolerance and flexibility • Education and training
VALUES AND ETHICS	• Realization and articulation of values held • Reasons for values and alternative values • Cultural diversity, differences and similarities • Ethics and behaviour - Honesty - Integrity - Tolerance • Value systems and value changes • Norms of society and change • Legal factors • Impact of values and ethics on work and social practices • Adopting a positive attitude and empowerment • Empowerment of oneself and others • Democratic processes and participation

INTEGRATED TABLE OF KEY COMPETENCIES

KEY COMPETENCY	SCOPE / SKILLS ANALYSIS
RESOURCE COMPETENCIES	• Human and physical resources • Establishing needs • Resource appraisal and evaluation • Resource alternatives • Allocating time, money, materials, equipment, space and staff • Materials handling, transport and storage • Process and product • Planning, acquiring and using resources • Consumption, resource sustenance and renewal • Environmental impact • Social implications • Impact of science and technology
INFORMATION COMPETENCIES	• Forms and types of information • Information systems • Acquiring and evaluating information • Storage and classification of information • Organising and maintaining information • Interpreting and communicating information • Oral, written and non verbal communication • Critical analysis of ideas and information • Communication in languages other than English • Using computers to process information • Social, ethical and legal aspects of information • Freedom of information in a democratic society • Ownership of information • Product and process patents • Information aspects of research and development
SYSTEM COMPETENCIES	• Understanding social, organisational and technological systems, cultures and contexts • Planning, goals, tactics and strategies • Designing or improving systems and monitoring and c rrecting performance • Mores and legal considerations • Process, quality assurance and change
PARTICIPATION AND MANAGEMENT COMPETENCIES	• Interpersonal skills • Participating as a member of a team • Teaching others new skills • Caring/welfare skills • Serving clients / customers / public • Leadership • Negotiating and working well with other people from culturally diverse backgrounds • Self expression and communication • History and philosophy of management • Establishing needs and direction • Long and short term planning • Development of strategies and implementing plans that achieve goals that are ethical and sustainable • Staff selection, development and evaluation • Motivation, leadership and conflict resolution • Industrial relationships • Innovation, design, research and development • Efficient and effective use of physical and human resources • Co-operative action and sharing • Empathy, impartiality, honesty and integrity • Legal requirements and ethics • Technical competence in field managed • Involvement, devolution and empowering • Information dissemination • Mathematics in social sciences • Accountability • Marketing and selling • Education and training • Financial systems and audit • Consultative and group methods • Equal opportunity • Hygiene, health and safety • Quality management • Adapting to change and skills transfer

INTEGRATED TABLE OF KEY COMPETENCIES

KEY COMPETENCY	SCOPE / SKILLS ANALYSIS
PSYCHO-MOTOR COMPETENCIES AND ERGONOMICS	• Human movement and ergonomics • Physiological and psychological preparation and issues • Application of tools and equipment • Use of materials • Health and safety • Protective and suitable clothing or attire • Work and skills analysis and audit • Work planning • Work design and performance • Value of work and social purpose • Performance standards, levels and criteria • Preparing for a performance and precautions • Giving or carrying out of a performance. For example: - making - machine operation - manufacturing - design drafting - processing - mixing substances and chemicals - provision of personal services - diagnosis, service, repair and maintenance - tending animals - tending crops, etc. - health and medical services - transport and navigation - measurement and testing - mining - defence - music, dance and drama - sport • Individual and group performance • Co-ordination and management • Practice and consistency in performance • Working or performing in awkward or extreme conditions • Training and preparation • Overcoming disability • Evaluation and improvement • Consequences of physical work • Research
SCIENTIFIC AND TECHNOLOGICAL COMPETENCIES	• History and philosophy of science • Knowledge of new and developing technologies • Physical, biological, social and natural sciences • Scientific and technological understanding • Scientific method and problem solving • Mathematics in science and technology • Technological change • Social and environmental impacts • Health and safety • Ethics of scientific endeavours and new technologies • Applying science and technology in: - design - products - processes - services • Research and development • Change and obsolescence • Measurement and testing • Communication in science and technology • Planning and resourcing scientific activities and technological developments
CREATIVE COMPETENCIES	• The nature of the creative process • Society and creativity • History and philosophy of: - design - fine art - architecture - music - industrial design - graphics - craft - drama - film and television production - commercial art and design • Conceptualization, media and expression • Creativity in all work and life roles • Creativity in ideas and objects • Creativity and social comment • Creativity and function • Creativity and change • Fashions • Application of concepts and philosophies to particular activities or projects

8. APPLICATION OF KEY COMPETENCIES

8.1 Use of key competencies

A definition of key competencies is a useful tool in:

- Work analysis
- Skills audits
- Curriculum design
- Development of teaching/learning strategies
- Assessment of learning and prior learning
- Preparation for entry to the workforce.

Transfer of learning lies at the heart of the concept of key competencies. Knowing what the relevant key competencies within a particular work or industrial sector are, permits systems design methods to be used in work organisation and the restructuring of education and training.

8.2 Key competencies in work analyses and skills audits

Work analyses are not solely based on observation, since many cognitive processes cannot be observed. Persons carrying out work analyses base their reports on:

- Observation of work done
- Outcomes of the work process
- Machines and equipment usage
- Materials handling and usage
- Analysis of critical incidents
- Workplace organisation
- Human interaction
- Workplace strategies and objectives
- Theory of work.

The theory of work will include a knowledge of key competencies that one expects to find inherent in certain work functions, as well as implicit understandings that arise from the use of certain kinds of tools, machines and management philosophies.

In observing and interviewing to establish a work analysis schedule, the questions asked, or expectations held about what should be there to observe, will be based on concepts of generic skills. In organising analysis and audit information key competencies permit the identification of skill sets that link the individual skills practiced.

8.3 Key competencies in curriculum design and the development of teaching/learning strategies

When devising a structured learning program the designer seeks to identify the broad categories of activities that make up the work area. By identifying in the work analysis, for example, that all engineering activities comprise of communicating, planning, implementing and appraising, then the scope of learning and training is also defined. Further, by postulating that automotive mechanics diagnose and repair vehicles of specific kinds made up of integrated electrical, mechanical, electronic and hydraulic systems, the spa of what is to be undertaken in education and training is defined.Without such definitions that are usually enshrined in the course aim, a very different type of learning program will result. The generic or key competencies synthesize the individual skills into clusters and permit the structuring of the learning process. It permits decisions as to whether "signal", "chain", "multiple", "concept" or "principle" structures will be used to organise the learning experiences that meet specific objectives.

8.4 Key competencies in assessment

Good curriculum design practice usually allocates ninety percent of a program to doing and learning, and about ten percent to assessment. A major concern in competency based education and training is a potentially massive increase in assessment time. By understanding that individual skills form parts of larger sets of key competencies, more efficient and meaningful assessment will result. Assessment will tend to be of the whole, or major combinations of the sub

parts of key competencies, rather than of individual and minute skill components. By assessing "skill sets" the assessment is more valid as well as less time consuming and costly. The ability of the student or worker to synthesize the individual skills is of considerable importance in the effective performance of work.

8.5 Key competencies in preparation for entry to the workplace

Mayer, Finn, F.E. (UK) and SCANS are largely about the preparation of secondary school students for entry to the workforce. Because the student's specific employment destinations are not known, the generic skills associated with work are concentrated upon to make the new worker productive sooner. Also being addressed is the bias in secondary school programs toward University entry, rather than meeting the diverse needs of the largest group of students, who will seek a vocation and continue education on-the-job or in such institutions as TAFE. There has been considerable criticism by employers of the basic skills possessed by persons in initial employment. Competency based education based on generic skills is about motivating students in secondary education by offering relevant and flexible education to meet a wide range of needs.

9. CHARACTERISTICS OF A COMPETENCY BASED EDUCATION SYSTEM

9.1 The essential characteristics of many competency based education systems are:

- A careful definition of the competencies to be achieved and knowledge of these by the learner.
- Learner understanding of the contexts to which the competency relate or could relate.
- Specification of the standards and level expected (for example, novice, skilled, expert).
- Learner competencies sufficient to successfully participate in the program and recognition of prior learning.
- An appropriate learning process that best facilitates individual learning.
- Recognition of the graduate and employment.
- Work and educational pathways or articulation that permit worker to progress and contribute to the optimum of ability.

9.2 Other characteristics are that:

9.2.1 Competency based education is not the antithesis of discipline based studies. The two are integrated and by necessity complementary. Competency education is part of an educational set that also includes:

Foundation studies and basic education
Contextual studies
Discipline studies
Research and development
Human resource development
Work practice
Self directed learning
Further education.

Each of these include the achievement of capacities and competencies but may not reflect all the essential characteristics of a competency based system.

9.2.2 Foundation and basic education is a pre-condition for participation in vocational education. Entry and bridging courses may be necessary to enhance successful participation to the standards and within the time frame expected. Tutorial support may be necessary to overcome disadvantage, learning difficulties or to build self confidence.

9.2.3 Competency based education implies a mix of teaching methods and learning styles but these tend to be skewed towards:

Learning by performance
Discovery learning
Problem based learning.

9.2.4 Some common elements within the methods used in competency based education are:

- Acceptance of experience based learning;
- Relevant learning situations that display an appropriate balance between practice and theory;
- Learner and teacher understanding of the various contexts in which performance will take place;
- Skills transfer derived by treating familiar and unfamiliar applications;
- Recognition of generic skills (key competencies) that underpin performance in life roles;
- Student access being facilitated by appropriate methods of assessment and the recognition of prior learning and experience;
- Multi and cross disciplinary teaching/learning strategies that may necessitate course integration and team teaching;

- A closer relationship between work-experience and off-the-job education (particularly in the case of the increasing numbers of full-time students);

- Statement of standards and outcomes expected for a particular level of performance;

- Enhancement of the role of the teacher as a manager of learning - a skilled helper, adviser and counsellor for the learner;

- Recognition of the contribution that the student makes to the learning situation by virtue of their experience as an adult and often as a worker in a relevant industrial sector;

- Industry input into practical work and projects, while at the same time noting that these activities need to be viable in terms of costs, other resources, student capacity and time constraints;

- Synthesis of the content of subjects and modules for overall assessment of performance.

- Use of flexible course structures developed after appraisal of all the levels of need in a given industrial sector. The flexible course structure needs to be based on an appropriate decision as to what are the parameters of the industrial sector being considered. For example should one treat manufacturing or just metal manufacturing in a design effort?

- Professional, technician, trade and operative performance levels are approached as an integral cluster for curriculum design purposes.

10. SUMMARY

10.1 The definition of the key competencies or generic skills that underlie vocational education has significant implications for educational and industrial policy, the establishment of competency specifications for major work areas, and curriculum design and delivery.

10.2 The post-industrial revolution is underpinned by information technologies, and the changed social organisations which result from them. Part of that revolution is that the supposed dichotomy between general and vocational education ceases to exist and in its place is emerging a set of key competencies required by all citizens to enable them to perform life roles and to adapt to constant change. Discipline studies need to be combined with the ability to deliver a competent work performance.

10.3 Epistemological frameworks are required by the individual to absorb and accommodate rapid technological and social change; and algorithms are required to use the changing knowledge input to solve problems and facilitate the transfer of skills to new situations. Performance in vocational education is the integration of knowledge, skills attitudes and values, and appreciations critical to the ability to do something that has a value recognised by society. Integral to performance is the integrity of that performance - the purpose it serves, what it achieves, and how it relates to the well being of society. Historically the evaluation of performance can change depending on the period in time and upon the criteria by which it is judged. Establishing criteria, and value analysis, are also integral to the quality management of any performance.

10.4 The competencies to do, to participate in change, to manage change, to transfer skills and to act ethically need to be learnt through the culture of which education is a part. Learning can be informal and formal. Formal learning is greatly assisted by a planned and structured learning strategy (curriculum) and specified learning processes. Informal learning needs to be better recognised and rewarded. Competency based education is not just about learning a list of skills, assessed

against a checklist. It is a complex process in which both the process itself and outcomes are of importance. Vocational education is concerned with competencies needed for immediate performance as well as adapting the performance to new situations.

10.5 Educational and industrial practice needs to formally recognise this and use it in the theoretical framework that underpins work analysis and work audits, curriculum design and delivery. To achieve, both process and outcome need to be managed and evaluated to ensure that competencies attained are adequate for a rapidly changing society. Quality assurance and management in education (as in industry) is concerned with process as the effective combination of people and resources, to achieve an outcome to a given standard.

10.6 The specification of key competencies provides a focus for making sense of the thousands of individual skills that may cluster into tasks that go to make up performance and that can change to suit the environment as the need arises. Skills learnt today must be transferable and applicable tomorrow.

10.7 Competency concepts have challenged the direction and balance of existing educational design and delivery. This challenge should be addressed by examining all the issues raised and accepting, rejecting and integrating the concepts as appropriate into the teaching/learning strategies and processes we use.

APPENDICES

A. FURTHER EDUCATION UNIT (UK) KEY COMPETENCIES (1987)

B. BUTTERWORTH AND LOVELL - SKILL GROUPINGS AND DESCRIPTIONS (1983)

C. U.S. SCANS DEFINITIONS OF FOUNDATION AND KEY COMPETENCIES (1991)

APPENDIX A

FURTHER EDUCATION UNITS (UK) KEY COMPETENCIES

A 16-18 Core: CPVE

General education delivered through vocational studies

1. The core studies developed for CPVE are intended to reflect the general education to which all young people on courses approved by the Joint Board for Pre-Vocational Education should have access. They have been described in terms of aims and objectives which can be readily matched to a range of achievements and experiences in a variety of contexts. It is intended that students should address all the aims and that the objectives should be used as a checklist in the planning and evaluation of programmes and to identify appropriate opportunities for progression. In terms of course design, the aims and objectives should be put together in such a way as to reflect the curriculum as a whole rather than being regarded as discrete activities. The CPVE framework recognises that the achievement of core aims and objectives will be met in a variety of ways, but specifically identifies vocational studies as a focus for the development and application of the core. Core and vocational studies must be integrated for a minimum of 20% of the total course time of 700 – 900 hours.

A range of experiences and competences

2. The CPVE core is described in terms of a range of experiences and competences (which includes skills, knowledge and attitudes) which are essential to the students' chances of making a success in adult life, including work. The core competences are broadly based and capable of application in a variety of situations. They are grouped into ten areas:

- Personal and Career Development
- Industrial, Social and Environmental Studies
- Communication
- Social Skills
- Numeracy
- Science and Technology
- Information Technology
- Creative Development
- Practical Skills
- Problem Solving

Entitlement and certification

3 Core and vocational studies must continue for the whole duration of a CPVE course and occupy a minimum of 75% of course time. Some students will have previously achieved many of the core competences to some degree. It is not intended, therefore, that students should attempt all the objectives or that they should tackle them all to the same depth or in the same context. However, each student must have the opportunity of relating to all core aims, in order to study, gain experience and optimise his/her competences according to individual need and potential. Attainments in all ten core areas are recorded on the CPVE certificate.

Learning strategies

4. A vocational focus, activity-based learning, work experience and guidance, and student support are learning strategies integral to CPVE. Achievement of many core objectives requires the use of practical activities to develop students' experience and to provide opportunities for applying and reapplying knowledge and skills. Activity-based learning also provides the basis for encouraging student self-development and increasing autonomy. To achieve this it must be based on the needs, interests and resources of the individual. Work experience is an essential component of a CPVE course, providing opportunities for young people to develop and apply core competences, and to reflect and learn from their experience in a real work situation. A system of counselling and guidance related to formative assessment and profiling enables CPVE students to review their progress with tutors and to participate in planning their own programmes and learning.

The extracts that follow on pages 29 to 34 are taken from *The Certificate of Pre-Vocational Education, Part B, Core Competences and Vocational Module Specifications* Joint Board for Pre-Vocational Education, January 1985.

PERSONAL AND CAREER DEVELOPMENT

It is intended that the aims and objectives presented under this heading should be developed throughout an approved CPVE course and should enable students to acquire, practise and transfer their achievement within a variety of relevant and integrated activities.

MAIN AIM

To develop in young people a perception of their potential role and status in an adult, multicultural society, including the world of work.

AIM 1: PERSONAL DEVELOPMENT

To develop critical awareness of own abilities, needs and interests and the capacity to make best use of them by:

1.1 increasing awareness of personal characteristics, preferences, qualifications and capabilities
1.2 taking responsibility for development of personal characteristics, preferences, qualifications and capabilities
1.3 participating in the setting of personal goals and their assessment
1.4 comparing other people's perception of self with own self-assessment.

AIM 2: CAREER DEVELOPMENT

To develop skills, knowledge and experience for adult life by:

2.1 recognising the factors which influence job choice, job satisfaction and associated rewards – training, unionisation, social status and conditions
2.2 recognising the influence of economic structures on employment
2.3 recognising the influence of employment on life style and aspirations
2.4 gathering information on the range of job opportunities available and suitable methods of access
2.5 gathering information on the range of opportunities available outside paid employment
2.6 practising tasks involved in finding and getting work; exploring the factors influencing selection, including employers' expectations and, where appropriate, employer and trade union regulations
2.7 recognising the possibility of both unemployment and the need for retraining
2.8 identifying patterns of family and social life and the roles and responsibilities of individual members
2.9 recognising the attitude changes involved as individuals adopt new roles within family and other social groups
2.10 taking responsibility for health and safety of self and others.

AIM 3: MORALS AND ETHICS

To consider a range of social, moral and ethical issues and formulate personal values by:

3.1 recognising the relationship between rights and responsibilities of citizens in a democratic society
3.2 formulating a code of behaviour in relation to selected issues and dilemmas, involving clashes of principle
3.3 recognising bias and its effect on human relationships – race, sex, age, class, and religious discrimination
3.4 analysing the positive and negative consequences of taking risks – in physical pursuits, emotional attachments, change of environment.

Tutors and students should be aware that the objectives listed above may also apply to other core areas and that appropriate recognition should be given to their achievement.

INDUSTRIAL, SOCIAL AND ENVIRONMENTAL STUDIES

MAIN AIM

To develop knowledge of the workings of modern industry and society and a capacity to cope with the limitations and opportunities afforded.

AIM 1: WORLD OF WORK

To develop informed and critical awareness as to the role and status of young people in the world of work by:

1.1 investigating the need for the systems and management requirements of different types of organisations
1.2 investigating the roles and responsibilities associated with a range of jobs or functions
1.3 identifying and considering factors that influence progress in working life
1.4 investigating the roles and methods of operation used by trades unions and professional associations.

AIM 2: POLITICAL CONSIDERATIONS

To develop awareness of political considerations in order to understand and participate in the social environment by:

2.1 participating in a variety of decision-making activities and evaluating the methods by which decisions are reached
2.2 identifying the individual's rights and opportunities for political involvement and the factors upon which these depend
2.3 investigating and explaining common features of political processes in a range of contexts
2.4 investigating the differences between the major British political parties
2.5 explaining the roles and responsibilities of local and central government and the effects of their activities
2.6 identifying and explaining the purposes of the major international political and economic organisations.

AIM 3: ECONOMIC CONSIDERATIONS

To develop awareness of economic considerations in order to understand and participate in the social environment by:

3.1 understanding the management of personal finances
3.2 developing knowledge and skills related to the financial management of business
3.3 developing knowledge and skills related to the financial management involved in self-employment
3.4 investigating the effects of local and national government policies on the economic activity of individuals and business
3.5 investigating the influence of international trade and international events on economic activity of individuals and business
3.6 investigating the relationship between costs and benefits arising from economic activity at a national, organisational and individual level.

AIM 4: LEGAL CONSIDERATIONS

To develop awareness of legal considerations in order to understand and participate in the social environment by:

4.1 investigating the role of moral values and laws in supporting social structures
4.2 understanding the legal rights, duties, and responsibilities of the individual
4.3 identifying the role of police and courts in the enforcement of law and the protection of the rights of individuals and groups
4.4 understanding laws relating to employment.

AIM 5: SOCIAL CONSIDERATIONS

To develop a sense of social responsibility in relation to various social, technological and environmental issues by:

5.1 developing awareness of pressures on the environment
5.2 understanding relationships between the environment and the quality of life of the community
5.3 developing awareness of the responsibility of the community for its members
5.4 investigating ways in which current developments in technology influence the quality of life.

Tutors and students should be aware that the objectives listed above may also apply to other core areas and that appropriate recognition should be given to their achievement.

COMMUNICATION

MAIN AIM

To develop communication skills as a way of structuring relationships between people in a changing and multicultural society.

AIM 1: LISTENING

To listen and respond appropriately to oral requests and presentations by:

1.1 listening and responding to information presented in a variety of styles and range of contexts – one-to-one/group, familiar/unfamiliar, formal/informal
1.2 selecting information relevant to a particular purpose in a range of face-to-face and other situations (e.g. telephone messages).

AIM 2: SPEAKING

To talk appropriately in range of situations by:

2.1 talking effectively in a variety of styles and range of contexts – one-to-one/group, familiar/unfamiliar, formal/informal
2.2 speaking sufficiently clearly, audibly and fluently to maintain the understanding and confidence of the listener(s) in a range of face-to-face and other situations (e.g. by telephone)
2.3 formulating and conveying requests and instructions clearly and concisely
2.4 asking relevant questions to elicit information and seek clarification
2.5 initiating and sustaining conversations in a range of contexts.

AIM 3: READING

To read and understand written texts, tabular and graphic data in various forms and identify points relevant to a particular purpose by:

3.1 reading and understanding information presented in written, tabular and graphic form
3.2 reading and understanding written information presented in a variety of styles
3.3 selecting information relevant to a particular purpose from a variety of given sources – including electronic information sources (e.g. Prestel, Ceefax).

AIM 4: WRITING

To write effectively, organising content and observing the formal conventions of writing by:

4.1 formulating and conveying written information in a variety of styles and for a range of purposes
4.2 observing the conventions of legibility, spelling, punctuation and grammar in order to maintain the confidence of the intended audience.

AIM 5: COMMUNICATION AND INTERPRETATION

To understand, evaluate and respond to information and opinions conveyed in written, oral and other forms by:

5.1 identifying, analysing and responding critically to ambiguous and confusing statements
5.2 identifying statements which are/are not supported by evidence
5.3 supporting statements of facts or opinion with appropriate evidence
5.4 identifying, analysing and responding critically to the emotive use of language
5.5 recognising and responding to non-verbal communication
5.6 appreciating the appropriateness of, and applying a range of, non-verbal communications for different purposes and audiences
5.7 appreciating and using the effects of tone, pace and emphasis in conveying meaning
5.8 identifying, understanding and responding critically to implicit meanings in communication – mood, interests, prejudices
5.9 investigating the value of possessing competence in a second or foreign language or languages
5.10 investigating the relationship between cultural background and communication
5.11 making informed judgements about the appropriateness of sources for the retrieval and collection of information
5.12 evaluating the reasons for the success or failure of communication.

Tutors and students should be aware that the objectives listed above may also apply to other core areas and that appropriate recognition should be given to their achievement.

SOCIAL SKILLS

MAIN AIM

To develop ability to make effective personal and working relationships and to promote self-reliance.

AIM 1: WORKING IN GROUPS

To appraise the shared purposes, procedures and internal dynamics of groups by:

1.1 participating in a variety of ways in group tasks
1.2 understanding formal and informal procedures used by groups to conduct their business and achieve their purposes
1.3 recognising the different needs represented within a group – to be included, to influence others
1.4 observing how the behaviour of self and others may change in different group situations
1.5 recognising and understanding tensions generated within groups
1.6 contributing to achievement of the overall purposes of the group.

AIM 2: ANALYSIS AND EVALUATION

To recognise and evaluate the responses of others to one's own performance, behaviour and personality by:

2.1 practising and developing ability to listen and respond to others
2.2 identifying possible reasons for differences in responses
2.3 judging how behaviour might be modified as a result of personal evaluation of the opinions, values, assumptions, needs and expectations of self and others
2.4 contributing to the self-evaluation of others by sharing perceptions of them through constructive one-to-one and group evaluations
2.5 summarising and reviewing opinions and judgement of self recognised through participation in groups and one-to-one discussions.

AIM 3: ROLE IDENTIFICATION

To experience and appraise the influence of personal situational roles on the behaviour of self and others by:

3.1 understanding the concept of role and how it affects own and others' behaviour, perceptions and decisions

3.2 identifying and evaluating the influence on the behaviour of self and others of different personal roles – parent, daughter/son, colleague, friend

3.3 recognising, defining and evaluating the influence on the behaviour of self and others of different situational and organisational roles – manager/supervisor-worker, teacher-student

3.4 reflecting upon changes in role already experienced and understanding possible implications for the future

3.5 recognising, experiencing and understanding how various conflicting roles affect the behaviour of self and others

3.6 distinguishing between appropriate and inappropriate behaviour in a range of personal and situational or organisational roles (e.g. acting as representative of an individual or group)

3.7 selecting appropriate behaviour and procedures for achievement of a specified goal

3.8 investigating ways in which personal effectiveness in the achievement of identified goals might be improved.

AIM 4: CATEGORIES OF GROUPS

To recognise and analyse the signs used to allocate individuals to categories, and to be aware of the prevalence and abuses of such categorisation by:

4.1 observing individual differences between members of groups

4.2 identifying factors used in placing people into categories – gender, class, race, dress, speech, age

4.3 assessing the usefulness of such categorisations in developing effective working and social relationships

4.4 recognising misuses of categorisation of individuals and groups – working, social, cultural and religious

4.5 recognising own and others' reactions to being placed in categories.

Tutors and students should be aware that the objectives listed above may also apply to other core areas and that appropriate recognition should be given to their achievement.

NUMERACY

MAIN AIM

To develop mathematics as a communication skill to levels adequate to meet basic demands of contemporary society, and to provide a foundation appropriate to the acquisition of further skills.

AIM 1: NUMERICAL CONCEPTS

To develop understanding of, and competence in, the use of the concepts, skills and language associated with numbers as used in everyday and working life by:

1.1 recognising and using numbers and the relationships between them

1.2 interpreting place value

1.3 performing the four arithmetical operations on whole numbers, common fractions, decimal fractions

1.4 converting common fractions to decimal fractions and vice versa (e.g. comparing weights and measures expressed in different terms)

1.5 simplifying expressions involving common and decimal fractions

1.6 recognising recurring decimals, reducing decimal fractions to a given number of decimal places correct to a given number of significant places in order to provide information which is easily understood

1.7 calculating percentages

1.8 converting common and decimal fractions to percentages and vice versa

1.9 applying the concepts of ratio and proportion to practical situations (e.g. bicycle gears, cookery, scales on maps)

1.10 using common standard units of measurement

1.11 reading graduated scales – scales and dials used for measurement

1.12 making appropriate conversions between Imperial and Metric units

1.13 making everyday approximations and estimations

1.14 collecting, classifying, tabulating and interpreting data

1.15 using and interpreting tables of figures (e.g. timetables, conversion charts)

1.16 constructing and using simple frequency distributions (e.g. traffic census, population characteristics)

1.17 calculating probabilities involving a single event

1.18 calculating and interpreting range and common measures of central tendency (average) – mean, median and mode

1.19 solving problems involving simple logical and algebraic concepts including
- set theory (without necessarily using the associated formal language)
- use of a letter to represent an unknown quantity
- substitutions into simple formulae (expressed in words where possible)

1.20 using calculators, ready reckoners, pencil and paper or mental arithmetic as appropriate.

AIM 2: SPATIAL CONCEPTS

To develop an understanding of spatial concepts and competence in the use of simple geometrical relationships and graphical representations by:

2.1 recognising and naming simple plane figures – quadrilateral, triangle, circle

2.2 using common geometrical terms

2.3 determining areas and perimeters of rectangles

2.4 determining area and circumference of circles

2.5 estimating/approximating area

2.6 measuring angles

2.7 constructing simple plane figures to given specifications

2.8 recognising and naming common solid shapes – cube, pyramid, cylinder etc.

2.9 determining volume of common solid shapes

2.10 determining surface area – nets of solid shapes

2.11 estimating/approximating volume

2.12 using points of the compass/co-ordinates to locate objects or places

2.13 estimating and determining length using a scale – maps and plans

2.14 drawing sketch maps and plans

2.15 reading, interpreting and drawing simple graphs, pie charts, pictograms

2.16 following and constructing simple flowcharts for giving instructions, finding faults.

Tutors and students should be aware that the objectives listed above may also apply to other core areas and that appropriate recognition should be given to their achievement.

SCIENCE AND TECHNOLOGY

MAIN AIM

To develop understanding of science and technology, and their relationship to everyday life, and competence in the application of practical, scientific method.

AIM 1: APPRECIATION OF SCIENCE AND TECHNOLOGY

To develop appreciation of science and technology, their relationship with society and the environment and awareness of moral and legal implications by:

1.1 drawing up a brief for an investigation or project involving an example of the interrelationship between science and technology, society and the environment
1.2 conducting the above investigation using appropriate information sources and research methods
1.3 presenting a report which takes into account environmental, social, economic, legal and political factors relevant to the investigation.

AIM 2: APPLICATION OF SCIENCE AND TECHNOLOGY TO PROBLEMS

To develop a critical approach and an ability to apply principles, reasoning and skills to problems and issues of everyday life by:

2.1 differentiating between problems with technical and non-technical solutions
2.2 identifying and describing the nature of simple scientific and technical problems
2.3 suggesting and selecting alternative explanations, causes or solutions – by forming hypotheses, using models, using analogies
2.4 following technical instructions and working to a plan.

AIM 3: SCIENCE

To develop facility in using scientific methods to conduct investigations and evaluate their outcomes by:

3.1 planning investigations and designing experiments in order to test explanations
3.2 selecting, assembling and using scientific and technical apparatus and instruments appropriately
3.3 observing and recording data and procedures systematically and accurately
3.4 interpreting and evaluating data and results of experimental work in order to make deductions and draw conclusions
3.5 evaluating and investigating experiments, and procedures – identifying sources of error and explaining their significance, devising and using simple tests to check the validity of measurements and experimental work
3.6 generalising, as and when appropriate, from experimental results
3.7 identifying the scientific facts underlying investigations undertaken using appropriate terminology and conventions
3.8 identifying the scientific laws, principles and generalisations underlying investigations undertaken using appropriate terminology and conventions
3.9 demonstrating understanding of scientific laws, principles and generalisations by applying knowledge gained in one context to other contexts
3.10 satisfying all necessary health and safety requirements in planning and conducting investigations.

AIM 4: TECHNOLOGY

To develop understanding of the processes of planning, implementing and evaluating technological activities by:

4.1 drawing up a design brief from given requirements and constraints, including time and cost limits
4.2 drawing up a plan of work, including allowance for information search, design execution, testing and evaluation of process or product, reporting and timetabling of project
4.3 collecting relevant information, identifying assumptions and approximations made on the basis of incomplete data
4.4 producing alternative tentative solutions, including reference to both original ideas and solutions tried and tested elsewhere
4.5 comparing alternatives systematically, selecting the best alternative(s) for future development
4.6 drawing up final design(s), investigating and evaluating suitable materials and processes as necessary
4.7 making, modifying or modelling as appropriate to test the design
4.8 evaluating the outcome(s) in terms of the design specifications and the processes involved and suggesting further development as appropriate
4.9 demonstrating understanding of the importance of maintenance procedures
4.10 satisfying all necessary health and safety requirements in planning and conducting activities.

Tutors and students should be aware that the objectives listed above may also apply to other core areas and that appropriate recognition should be given to their achievement.

INFORMATION TECHNOLOGY

MAIN AIM

To develop appreciation of the implications of Information Technology (IT) for society and the individual and to provide the opportunity to acquire a practical introduction to its basic applications.

AIM 1: AWARENESS OF IT

To develop awareness of the social implications of IT for work, leisure and domestic use by:

1.1 plotting and explaining the growth and development of IT
1.2 investigating the main ways in which IT is leading to changing requirements in the job market and may be affecting the characteristics of employment in various sectors of the economy
1.3 investigating some possible effects of the growth of microtechnology on industry and society including the need for security of information
1.4 recognising the need for security of information and the need for access to personal information held on databases.

AIM 2: USE OF MICROCOMPUTERS

To develop confidence in the use of microcomputers and their application by:

2.1 connecting up and preparing a simple microcomputer system for use
2.2 loading a pre-written program from backing-store and using it to perform a set task
2.3 using application packages e.g. word processing, accounting packages, spreadsheets and databases in real or simulated business situations
2.4 using teletext or viewdata systems to obtain or disseminate specified information
2.5 using unit replacement procedures to locate and rectify faulty equipment.

AIM 3: DATA PROCESSING

To develop practical appreciation of data handling and computer programming by:

3.1 illustrating a logical sequence of instructions – drawing a simple flowchart
3.2 reading and amending a simple program
3.3 writing and using a simple program involving input, processing and output from a specification provided
3.4 recording and presenting data in a form appropriate for input and use in an existing electronic database
3.5 interpreting data and drawing conclusions – from VDU and line printer.

AIM 4: APPLICATIONS OF IT

To develop an appreciation of the field of IT and its wide range of applications by:

4.1 identifying the main features of IT systems by giving examples of the roles and applications of microprocessors, computers and transmission systems in commerce, industry, education, the media, public services and the home
4.2 relating applications such as graphics, networks, robotics, CAL information bases to the examples derived from 4.1 above
4.3 identifying basic functions and elements of software systems, such as information of message coding, transmission and processing
4.4 giving examples of uses of large electronic communications systems
4.5 listing, and analysing using a system diagram, the hardware elements (inputs, outputs, major sub-systems) of an electronic communication system
4.6 discussing the concept of distributed processing and describing the devices and techniques which enable machines to communicate
4.7 investigating the control, measuring and monitoring functions of devices associated with such equipment as the BBC Buggy, Robot Arm, Turtle, Graphics Pad.

Tutors and students should be aware that the objectives listed above may also apply to other core areas and that appropriate recognition should be given to their achievement.

CREATIVE DEVELOPMENT

MAIN AIM

For young people both to become aware of their own creativity and to develop their powers of critical judgement by experiencing, originating and participating in a range of creative and expressive activities.

AIM 1: APPRECIATION OF CREATIVE PROCESSES

To undertake and explore creative and expressive activity so as to develop awareness of the range of creative processes and individual responses to them by:

1.1 identifying and experiencing a range of creative products – simple products with a day-to-day (e.g. household) function; products involving sophisticated modern technology and complex interaction with human beings in their use/realisation (e.g. car, motorbike, computer game)
1.2 participating in a range of creative activities – contributing to group activity such as production of course newsheet, play, video film; redesigning or finding new use for a used object
1.3 experiencing and analysing a range of cultural activities and events – ethnic, community, popular, serious, ceremonial, religious, sporting; different cultural forms and media
1.4 expressing a view of the creative purpose of the product or activity and the extent to which this has been achieved
1.5 communicating to peers feelings aroused by products or activities, preferences and reasons for these preferences
1.6 comparing own responses with those of others, suggesting reasons for differences
1.7 identifying areas where there is lack of response and suggesting reasons for this
1.8 identifying creative abilities which are common to a variety of contexts, including work.

AIM 2: APPLICATION OF CREATIVE PROCESSES

To apply own creative and expressive skills to the practical world by:

2.1 collecting and analysing a range of products reflecting own tastes and preferences
2.2 designing, planning and producing, as an individual and as a member of a group, a number of simple products with a specified purpose
2.3 participating in an expressive group activity
2.4 expressing own feelings through chosen expressive medium – writing, drama, dance, art.

AIM 3: DEVELOPING CRITICAL FACILITY

To develop ability to make critical judgements in expressive areas by:

3.1 participating in events which demand involvement and commitment, and events from which participants are distanced
3.2 applying basic criteria for appraisal in aesthetic areas
3.3 participating in exercises which seek to evaluate the influence of the medium in which an activity or process is carried out on the message which it conveys
3.4 expressing a view of the creative purpose of identified events
3.5 justifying personal likes and dislikes of self and others
3.6 identifying the influences of own culture/sub-culture on own forms of expression and creative activity
3.7 identifying contrasting influences on others of their own cultures
3.8 express reasoned views on cultures distanced from self by historical, social, ethnic and age differences.

Tutors and students should be aware that the objectives listed above may also apply to other core areas and that appropriate recognition should be given to their achievement.

PRACTICAL SKILLS

MAIN AIM

To develop practical, perceptual and related social skills within a variety of contexts.

AIM 1: MATCHING SKILLS

To evaluate own skills in relation to those demonstrated by experienced practitioners and required by a range of tasks by:

1.1 observing practitioners in a range of practical activities involving the application of practical skills
1.2 comparing working environments and their mental, physical and social requirements
1.3 identifying the competences required in each activity, against a checklist of practical skills
1.4 investigating the level and complexity of skills exhibited by an experienced/expert practitioner
1.5 identifying other practical activities which require the same skills
1.6 appraising own potential and preference in terms of the skills identified
1.7 collecting information on appropriate opportunities for application of practical skills in the locality
1.8 selecting activities which are most suited to own tastes and abilities.

AIM 2: PRACTISING SKILLS

To carry out to an appropriate standard a negotiated programme of activities both as a member of a group and as an individual by:

2.1 using effectively a range of materials, equipment, tools and processes including, where appropriate, those associated with new technology
2.2 maintaining tools and equipment to standards required for safe and efficient use
2.3 exercising judgement by choosing appropriate shapes, colours, materials.

AIM 3: EVALUATION OF PERFORMANCE

To evaluate own performance in relation to given tasks by:

3.1 identifying additional skills required to achieve tasks more quickly and effectively
3.2 setting targets for future developments and proposing means of achieving them
3.3 participating in peer appraisal of skills and achievements
3.4 reviewing own tastes and assessing own abilities in the light of practical experience.

Tutors and students should be aware that the objectives listed above may also apply to other core areas and that appropriate recognition should be given to their achievement.

PROBLEM SOLVING

MAIN AIM

To develop the confidence and ability to learn independently, to solve problems, to adapt to changing circumstances and situations, and to appreciate the value of developing self-reliance and self-organisation in all spheres of life.

AIM 1: EXPLORATION

To explore a wide range of issues methodically and effectively by:

1.1 sharing with other students personal experiences of problems encountered
1.2 comparing ways in which members of a group see these problems
1.3 discovering ways in which groups from differing backgrounds perceive and approach problems
1.4 establishing possible reasons for differences in perception and approach
1.5 finding out which problems are within the individual control or influence of people concerned
1.6 exploring and categorising, both as an individual and as a group member, a range of issues which are
- within/without individual control or influence
- soluble/non-soluble
- personal/community/national/international
- human/mechanical/natural
- negotiable/non-negotiable
- avoidable/unavoidable

1.7 investigating methods by which individuals can try to influence situations over which they have no direct control
1.8 suggesting a line of action which might influence a chosen situation
1.9 devising a plan for tackling problems, taking account of the constraints in 1.6
1.10 planning, monitoring and evaluating, as an individual and as a member of a group, an event or course of action
1.11 identifying other areas and activities where these skills developed are relevant and indicating how they have been or could usefully be applied.

AIM 2: DEVELOPMENT

To develop confidence, adaptability and a positive attitude to learning through experiencing and reviewing a variety of situations and processes by:

2.1 identifying own strengths and weaknesses against a checklist of commonly used and transferable basic skills
2.2 analysing a series of tasks against the checklist of basic skills
2.3 applying relevant aspects of previous learning to new situations
2.4 identifying personal needs in terms of skill development
2.5 setting initial targets for development
2.6 undertaking a series of tasks and identifying the degree of ease or difficulty with which they were achieved
2.7 reflecting on a variety of experiences – past and present, from inside and outside educational situations – and identifying how these experiences have contributed to learning
2.8 redefining targets for development.

Tutors and students should be aware that the objectives listed above may also apply to other core areas and that appropriate recognition should be given to their achievement.

Figure 4 YTS Core Skills QUICK REFERENCE LIST

NUMBER

1. OPERATING WITH NUMBERS

1.1 Count items singly or in batches
1.2 Work out numerical information
1.3 Check and correct numerical information
1.4 Compare numerical information from different sources
1.5 Work out the cost of goods and services.

2. INTERPRETING NUMERICAL AND RELATED INFORMATION

2.1 Interpret numerical data or symbols in written or printed form
2.2 Interpret diagrams and pictorial representations
2.3 Interpret scales, dials and digital readouts
2.4 Identify items by interpreting number, colour, letter codes or symbols
2.5 Locate places by interpreting number, colour or letter systems.

3. ESTIMATING

3.1 Estimate quantity of observed items or materials
3.2 Estimate quantities required for a process
3.3 Estimate portions or shares
3.4 Estimate dimensions of an observed object or structure
3.5 Estimate weight, volume or other properties
3.6 Estimate the time needed for an activity
3.7 Estimate the time an activity has been going on
3.8 Estimate the rate of use of items or materials
3.9 Estimate the cost of goods and services
3.10 Estimate and compare shapes or angles
3.11 Estimate the size of gaps or holes and the fit of items
3.12 Estimate required sizes of containers or covering materials
3.13 Estimate size or shape for the purpose of sorting
3.14 Estimate settings for tools, equipment machinery.

4. MEASURING AND MARKING OUT

4.1 Measure the dimensions of an object or structure
4.2 Mark out required dimensions and shape
4.3 Measure weight, volume or other properties
4.4 Measure out a required weight or volume
4.5 Measure the time a process or activity takes.

5. RECOGNISING COST AND VALUE

5.1 Compare the cost of different goods and services
5.2 Compare the relative costs and benefits of buying or using goods and services
5.3 Recognise the value of items in order to take appropriate care of them.

COMMUNICATION

6. FINDING OUT INFORMATION AND INTERPRETING INSTRUCTIONS

6.1 Find out information by speaking to other people
6.2 Find out information from written sources
6.3 Find out information by observing
6.4 Interpret spoken instructions
6.5 Interpret written instructions
6.6 Find out the needs of other people in the workplace
6.7 Find out the facts about things that have gone wrong
6.8 Find out the needs of customers and clients

7. PROVIDING INFORMATION

7.1 Provide information by speaking to other people in the workplace
7.2 Provide information by speaking to customers and clients
7.3 Provide information in writing, and by means of tables and diagrams
7.4 Provide information by demonstrating to other people
7.5 Provide information by answering questions in the course of the job
7.6 Provide information by explaining to others about problems that have occurred in the job.

8. WORKING WITH PEOPLE

8.1 Notice when to ask other people in the workplace for assistance
8.2 Ask other people in the workplace for assistance
8.3 Notice the needs of customers, clients and other people in the workplace
8.4 Offer assistance to other people in the workplace
8.5 React appropriately to requests from other people in the workplace
8.6 Discuss with other people in the workplace how things are to be done
8.7 React appropriately to complaints from other people in the workplace
8.8 Offer assistance to customers and clients
8.9 React appropriately to requests from customers and clients
8.10 Converse with customers and clients in order to establish or maintain an appropriate relationship
8.11 React appropriately to complaints from customers and clients
8.12 Notice where people behave exceptionally and whether action is required.

PROBLEM SOLVING

9. PLANNING: DETERMINING AND REVISING COURSES OF ACTION

9.1 Plan the order of activities
9.2 Plan who does what and when
9.3 Plan tools, equipment, machinery and stock and materials needed for a task
9.4 Plan the arrangement of items
9.5 Plan how to communicate for a particular purpose
9.6 Plan how to present information
9.7 Plan how to find information
9.8 Diagnose a fault
9.9 Plan how to deal with hazards and difficulties that might arise
9.10 Plan how to deal with things that have gone wrong

10. DECISION MAKING: CHOOSING BETWEEN ALTERNATIVES

10.1 Decide when action is required
10.2 Decide which category something belongs to
10.3 Decide between alternative courses of action
10.4 Decide how to make the best of an awkward situation
10.5 Decide on a correct response when accidents or emergencies occur.

11. MONITORING: KEEPING TRACK OF PROGRESS AND CHECKING

11.1 Check that he/she is performing a task to standard
11.2 Monitor a process or activity
11.3 Monitor the availability of stocks or materials
11.4 Check the quality and condition of equipment, materials or products
11.5 Check written information
11.6 Monitor the safety of the workplace
11.7 Notice that things have gone wrong, and that action is required.

PRACTICAL

12. PREPARING FOR A PRACTICAL ACTIVITY

12.1 Locate the place where work is to be carried out if it is not the usual one
12.2 Identify or locate
12.3 Handle, lift or transport
12.4 Check and adjust or clean
12.5 Arrange for sale and easy working

(TOOLS, EQUIPMENT, MACHINERY, MATERIALS, STOCK OR ITEMS, ANIMALS)

12.6 Carry out start-up procedures
12.7 Adjust heating, lighting, ventilation
12.8 Check for potential hazards in the work area
12.9 Carry out health and safety procedures.

13. CARRYING OUT A PRACTICAL ACTIVITY

13.1 Adopt safe working practices
13.2 Lift or transport objects or materials
13.3 Manipulate objects or materials
13.4 Operate and control or adjust tools, equipment, machinery or instruments
13.5 Set up, assemble or dismantle equipment, machinery, instruments or products
13.6 Adopt safe practices in the event of accidents or emergencies.

14. FINISHING OFF A PRACTICAL ACTIVITY

14.1 Carry out procedures to turn off or hand over TOOLS, EQUIPMENT, MACHINERY
14.2 Check products or results of activity for quality and accuracy
14.3 Carry out procedures for cleaning or routine maintenance
14.4 Carry out procedures to hand over products or results of activity
14.5 Carry out procedures to store or return TOOLS, EQUIPMENT, MACHINERY, MATERIALS, STOCK OR ITEMS, ANIMALS
14.6 Restock for future requirements if necessary
14.7 Check for potential hazards in the work area
14.8 Carry out health and safety procedures.

SOURCE: *Core Skills in YTS* (Part 1) MSC, September 1984

APPENDIX B

BUTTERWORTH AND LOVELL
SKILL GROUPINGS AND DESCRIPTIONS (1983)

TABLE 2

SKILL GROUPINGS AND DESCRIPTIONS
(Butterworth and Lovell, 1983)

A. MOTOR SKILLS	V.1 DISCRIMINATORY SKILLS* The skills which are essential for the observation and discrimination of differences in the physical characteristics of both inanimate objects (vibration, colour, texture, sound, surface finish, distance, etc.) and animate objects (breeds, species), excluding man. V = Variable * This objective relates to the five senses (taste, touch, sight, sound, smell) only. V.2 SKILLED MOVEMENTS Movements which students learn as an essential component of the course and which relate to the integration/co-ordination of deliberate body actions to achieve maximum economy, efficiency, safety, speed and effectiveness in performing tasks/operations, etc. V.3 MOTOR/ROUTINE SKILLS Skills in performing routines incorporating manipulation, mobility, posture and in co-ordinating these to carry out a set of procedures within a certain setting, e.g., workshop, office and/or laboratory.
B. THE USE OF TOOLS, MACHINES AND/OR EQUIPMENT	Learning the use of tools, machines, and/or equipment. V.4 SET, POSITION, SEQUENCE, OPERATE AND/OR ADJUST THEM TO FACILITATE THEIR OPERATION V.5 NUMERICALLY CONTROL/PROGRAMME THEIR OPERATION V.6 TEND/MONITOR USING INSTRUMENTATION SUCH AS DIALS OR GAUGES V.7 TEST AN OPERATION AND/OR DIAGNOSE FAULTS* * N.B. Excludes "Mixing skills" as detailed in V.10.
C. CONSTRUCTION, MIXING, REPAIR SKILLS	V.8 CONSTRUCTION/WORKSHOP SKILLS* The methods, techniques and skills involved in the construction (setting and laying out, fitting together, framing, building) of a component, object, etc. * N.B.Excludes report and essay writing skills as detailed in V.27. V.9 MIXING SKILLS The methods, techniques and handling skills involved in the operation of laboratories, kitchens, and areas where alloys, paints, glues or other ingredients are mixed, trialled and/or tested. V.10 SERVICE/MAINTENANCE/REPAIR/PRESERVATION SKILLS Skills and attitudes concerned with the service, maintenance, repair and/or preservation of tools, machinery, equipment, buildings, materials.

D.	MATHEMATICAL BASED SKILLS	V.11	MATHEMATICS, MEASUREMENT AND CALCULATING INSTRUMENTS Mathematical techniques may be used to measure, solve problems, facilitate diagnosis and design and/or estimate the characteristics of and/or relationships between objects, components, operations, tasks, etc.
		V.12	HAND/MACHINE READING AND DRAWING SKILLS Skills involved in the sketching, reading and drawing of plans, specifications, designs, drafts, patterns, blueprints, etc.
		V.13	PHYSICAL AND/OR FINANCIAL ESTIMATION Skills involved in the estimation of the physical (material) requirements of a task, operation, job, etc. and/or the financial and budgeting estimations associated with those activities.
		V.14	FINANCIAL RECORD KEEPING, ACCOUNTING, AUDITING AND RELATED DIAGNOSTIC KNOWLEDGE AND SKILLS The knowledge of financial record keeping and its associated accounting, auditing and financial diagnostic skills, is an important component of many courses dealing with the 'business side' of an organisation.
E.	DELIVERY OF SERVICE SKILLS	V.15	ESTABLISHING AND RESPONDING TO NEEDS* Instruction in the methods and techniques of establishing the needs and requirements of an operation and/or client, classifying them correctly and translating them into appropriate activities. N.B. Excludes diagnostic skills as outlined in V.7.
		V.16	CLERICAL SKILLS The skills involved in ordering, maintaining non-financial records, classifying, filing, etc.
F.	MANAGEMENT/PEOPLE SKILLS	V.17	ADVISORY/LEADERSHIP/COMMANDING SKILLS The methods, techniques, skills and attitudes in advising/leading/ commanding people.
		V.18	SELLING SKILLS The methods, techniques and attitudes involved in selling products/services, to individuals and/or organisations.
		V.19	EDUCATIONAL/INSTRUCTIONAL SKILLS The methods, techniques and skills involved in educating/ instructing people.
		V.20	CARING/WELFARE SKILLS Knowledge, attitudes and skills related to the care, service and welfare of humans, other animals and plants.
		V.21	GENERAL MANAGEMENT SKILLS Imparting relevant knowledge, attitudes and skills related to the supervision and/or management of human and non-human resources.

G.	INDUSTRY	V.22 KNOWLEDGE AND SKILLS RELATED TO NEW AND DEVELOPING TECHNOLOGIES New technology encompasses many areas. The meaning given to it in this document is "new devices and techniques for handling information, operations and performing tasks which are, as yet, utilised by the leading operators in the industry only". V.23 EVALUATION BASED UPON WRITTEN FACTORS EXTERNAL TO THE INDIVIDUAL OR ORGANISATION The knowledge and attitudes involved in the evaluation of actions/ behaviour in relation to written legislation, industry and professional codes. V.24 SAFETY AND OCCUPATIONAL HEALTH The acquisition of knowledge, attitudes and skills related to physical and mental health and hygiene, both in the workplace and in society generally. Such learning should be an intent of the course rather than incidental to it. V.25 THE INDUSTRIAL SYSTEM The knowledge and attitudes concerned with the functioning of the industrial system or some part of it. This objective would involve the study of subject areas such as work roles, industrial environment, trade unionism, the legal system, industrial relations, economics, etc.
H.	COMMUNICATION	V.26 NON-DISCURSIVE COMMUNICATION (NON VERBAL) SKILLS Expressive and interpretative movements - using any body action, except speech/sound, to express ideas, feelings, concepts, values. These may be learned actions and/or spontaneous responses to some stimulus. V.27 WRITTEN COMMUNICATION SKILLS Imparting and interpreting written information so that the message is conveyed with a minimum of interference. At an advanced level, it includes instruction in the techniques required to communicate to a wider audience using a combination of methods and the development of an appreciation and sensitivity to different shades of meaning that may be used. V.28 ORAL COMMUNICATION SKILLS Imparting and interpreting information through the development of oral and listening skills. V.29 CREATIVE SKILLS - DISPLAY, ENTERTAINMENT, DRAWING, CREATIVE DESIGN The methods, skills, techniques and attitudes related to the artistic presentation and/or the creation of artistic objects.

I. SOCIAL	V.30 SOCIAL CONTENT OF THE COURSE The development of knowledge of and attitudes towards the social, economic,, political and physical environmental systems and institutions of society. V.31 INDIVIDUAL AND/OR WORK RELATED RESPONSIBILITIES The inculcation of standards of personal presentation and/or work attitudes and actions that are deemed appropriate for the particular course. For example, attitudes and knowledge related to items such as personal, work-based and/or societal neatness, cleanliness, punctuality, reliability, self esteem, self confidence, etc.
J. COGNITIVE	V.32 KNOWLEDGE AND USE OF THE UNIVERSALS AND ABSTRACTIONS IN THE FIELD OF STUDY Knowledge and use of the body of principles and generalisations, together with their interrelationships, which present a clear, rounded and systematic view of complex phenomena, problems or fields. V.33 ANALYSIS OF ELEMENTS AND RELATIONSHIPS The breakdown of knowledge, work tasks, procedures, projects, etc., into constituent parts so that relationships between ideas or stages in a process are clearly comprehended. Such analytical ability is essential in diagnosing faults, depicting trends and detecting relationships between component parts of an operation. It is an essential ability also for the development of proficiency in the more complex manual/manipulative skills. V.34 SYNTHESIS The combination/integration of knowledge and skills from a variety of sources, for a variety of purposes. V.35 STUDY AND LEARNING TRANSFER SKILLS Many TAFE courses aim at "broad based" learning so that developed skills (learned behaviour) can be re-applied in different situations. Learning how to acquire the skills to learn and transfer skills to new situations, may therefore be an important objective of many TAFE courses.

K.	DEPTH	In measuring the competencies that are integral to an educational program the factor called 'depth' provides a synopsis of all the skills listed A - J above. It is intended to measure the totality of emphasis on practical skills, theoretical knowledge and attitude development. The following three variables (V.36, V.37 and V.38) have been labelled depth. The idea of depth has been given many names in the literature e.g. academic rigour, degree of difficulty, etc. V.36 Depth - Practical Skills Development of: 1. Practical skills that have a specific application and are limited in number or scope. 2. Practical skills that illustrate understanding of theoretical concepts. 3. A range of practical skills within a broad framework of knowledge including problem solving following established patterns. 4. A range of practical skills from a broad theoretical base, so that diagnostic ability, flexibility are increased and choices are able to be made. 5. A range of complex practical skills to an expert level of performance, thereby enabling the student/worker to cope with difficult and unusual problems. 6. All the above and involving synthesis of skills and creating something new from what exists. V.37 Depth-Theoretical Knowledge 1. Basic knowledge (information) underlying the area of interest. 2. Comprehension, including established problem solving techniques applied to tasks, operations etc. 3. The above plus learning of fundamental principles which enable the application of knowledge to problem solving situations where an analysis of the elements, relationships and/or the organisation involved in tasks/operations, is necessary. 4. Accomplishment of 3, plus evaluation of knowledge in terms of establish criteria or theories; and the development of unique ideas, plans or products, taking into account many options or alternatives. 5. Development of an epistemology, a philosophy of science, social or scientific theory or law statement etc. V.38 Depth - Attitudes 1. Development of basic and specific attitudes as they relate to personal development, co-operation, work, operations, and organisation or society. 2. Development of an integrated set of attitudes that supplement and/or complement the application of knowledge and/or skills in an organisational and/or societal setting. 3. Accomplishment of 2, plus the objective evaluation and analysis of attitudes, values, beliefs, which are held by themselves and/or others and their application. 4. The development of a set of values and ethics apolicable to a group within society. 5. Development of a philosophy of life, its propagation and application.

APPENDIX C

U.S. SCANS' DEFINITIONS OF FOUNDATION AND KEY COMPETENCIES (1991).

THE SECRETARY'S COMMISSION ON ACHIEVING NECESSARY SKILLS
U.S. DEPARTMENT OF LABOR
JUNE 1991

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DEFINITIONS: THE FOUNDATION

BASIC SKILLS

Reading. Locates, understands, and interprets written information in prose and documents—including manuals, graphs, and schedules—to perform tasks; learns from text by determining the main idea or essential message; identifies relevant details, facts, and specifications; infers or locates the meaning of unknown or technical vocabulary; and judges the accuracy, appropriateness, style, and plausibility of reports, proposals, or theories of other writers.

Writing. Communicates thoughts, ideas, information, and messages in writing; records information completely and accurately; composes and creates documents such as letters, directions, manuals, reports, proposals, graphs, flow charts; uses language, style, organization, and format appropriate to the subject matter, purpose, and audience. Includes supporting documentation and attends to level of detail; checks, edits, and revises for correct information, appropriate emphasis, form, grammar, spelling, and punctuation.

Arithmetic. Performs basic computations; uses basic numerical concepts such as whole numbers and percentages in practical situations; makes reasonable estimates of arithmetic results without a calculator; and uses tables, graphs, diagrams, and charts to obtain or convey quantitative information.

Mathematics. Approaches practical problems by choosing appropriately from a variety of mathematical techniques; uses quantitative data to construct logical explanations for real world situations; expresses mathematical ideas and concepts orally and in writing; and understands the role of chance in the occurrence and prediction of events.

Listening. Receives, attends to, interprets, and responds to verbal messages and other cues such as body language in ways that are appropriate to the purpose; for example, to comprehend; to learn; to critically evaluate; to appreciate; or to support the speaker.

Speaking. Organizes ideas and communicates oral messages appropriate to listeners and situations; participates in conversation, discussion, and group presentations; selects an appropriate medium for conveying a message; uses verbal language and other cues such as body language appropriate in style, tone, and level of complexity to the audience and the occasion; speaks clearly and communicates a message; understands and responds to listener feedback; and asks questions when needed.

THINKING SKILLS

Creative Thinking. Uses imagination freely, combines ideas or information in new ways, makes connections between seemingly unrelated ideas, and reshapes goals in ways that reveal new possibilities.

Decision Making. Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternatives.

Problem Solving. Recognizes that a problem exists (i.e., there is a discrepancy between what

is and what should or could be), identifies possible reasons for the discrepancy, and devises and implements a plan of action to resolve it. Evaluates and monitors progress, and revises plan as indicated by findings.

Seeing Things in the Mind's Eye. Organizes and processes symbols, pictures, graphs, objects or other information; for example, sees a building from a blueprint, a system's operation from schematics, the flow of work activities from narrative descriptions, or the taste of food from reading a recipe.

Knowing How to Learn. Recognizes and can use learning techniques to apply and adapt new knowledge and skills in both familiar and changing situations. Involves being aware of learning tools such as personal learning styles (visual, aural, etc.), formal learning strategies (notetaking or clustering items that share some characteristics), and informal learning strategies (awareness of unidentified false assumptions that may lead to faulty conclusions).

Reasoning. Discovers a rule or principle underlying the relationship between two or more objects and applies it in solving a problem. For example, uses logic to draw conclusions from available information, extracts rules or principles from a set of objects or written text; applies rules and principles to a new situation, or determines which conclusions are correct when given a set of facts and a set of conclusions.

PERSONAL QUALITIES

Responsibility. Exerts a high level of effort and perseverance towards goal attainment. Works hard to become excellent at doing tasks by setting high standards, paying attention to details, working well, and displaying a high level of concentration even when assigned an unpleasant task. Displays high standards of attendance, punctuality, enthusiasm, vitality, and optimism in approaching and completing tasks.

Self-Esteem. Believes in own self-worth and maintains a positive view of self; demonstrates knowledge of own skills and abilities; is aware of impact on others; and knows own emotional capacity and needs and how to address them.

Sociability. Demonstrates understanding, friendliness, adaptability, empathy, and politeness in new and on-going group settings. Asserts self in familiar and unfamiliar social situations; relates well to others; responds appropriately as the situation requires; and takes an interest in what others say and do.

Self-Management. Assesses own knowledge, skills, and abilities accurately; sets well-defined and realistic personal goals; monitors progress toward goal attainment and motivates self through goal achievement; exhibits self-control and responds to feedback unemotionally and non-defensively; is a "self-starter."

Integrity/Honesty. Can be trusted. Recognizes when faced with making a decision or exhibiting behavior that may break with commonly-held personal or societal values; understands the impact of violating these beliefs and codes on an organization, self, and others; and chooses an ethical course of action.

DEFINITIONS: THE COMPETENCIES

RESOURCES

Allocates Time. Selects relevant, goal-related activities, ranks them in order of importance, allocates time to activities, and understands, prepares, and follows schedules.

Allocates Money. Uses or prepares budgets, including making cost and revenue forecasts, keeps detailed records to track budget performance, and makes appropriate adjustments.

Allocates Material and Facility Resources. Acquires, stores, and distributes materials, supplies, parts, equipment, space, or final products in order to make the best use of them.

Allocates Human Resources. Assesses knowledge and skills and distributes work accordingly, evaluates performance, and provides feedback.

INTERPERSONAL

Participates as a Member of a Team. Works cooperatively with others and contributes to group with ideas, suggestions, and effort.

Teaches Others. Helps others learn.

Serves Clients/Customers. Works and communicates with clients and customers to satisfy their expectations.

Exercises Leadership. Communicates thoughts, feelings, and ideas to justify a position, encourages, persuades, convinces, or otherwise motivates an individual or groups, including responsibly challenging existing procedures, policies, or authority.

Negotiates. Works towards an agreement that may involve exchanging specific resources or resolving divergent interests.

Works with Cultural Diversity. Works well with men and women and with a variety of ethnic, social, or educational backgrounds.

INFORMATION

Acquires and Evaluates Information. Identifies need for data, obtains it from existing sources or creates it, and evaluates its relevance and accuracy.

Organizes and Maintains Information. Organizes, processes, and maintains written or computerized records and other forms of information in a systematic fashion.

Interprets and Communicates Information. Selects and analyzes information and communicates the results to others using oral, written, graphic, pictorial, or multi-media methods.

Uses Computers to Process Information. Employs computers to acquire, organize, analyze, and communicate information.

SYSTEMS

Understands Systems. Knows how social, organizational, and technological systems work and operates effectively within them.

Monitors and Corrects Performance. Distinguishes trends, predicts impact of actions on system operations, diagnoses deviations in the function of a system/organization, and takes necessary action to correct performance.

Improves and Designs Systems. Makes suggestions to modify existing systems to improve products or services, and develops new or alternative systems.

TECHNOLOGY

Selects Technology. Judges which set of procedures, tools, or machines, including computers and their programs, will produce the desired results.

Applies Technology to Task. Understands the overall intent and the proper procedures for setting up and operating machines, including computers and their programming systems.

Maintains and Troubleshoots Technology. Prevents, identifies, or solves problems in machines, computers, and other technologies.