

TOPIC: BANKING
Sub-section: Fundamentals of Financial Accounting

School of Continuing Education
Al Yamamah University
Riyadh, Saudi Arabia

LEARNING OUTCOMES:

Students will:

a.) be able to pick up any (domestic) Company's Financial Statement and assess that company's financial stability, cash flow prospects, & balance sheet:

b.) analyze a company's current liabilities and long-lived assets; Prepare depreciation and amortization journal entries. Understand and calculate money valuation using the time value of money principles.

Students will develop skills in order to:

1. Discuss and account for debt financings and corporate stock transactions, and their valuation.
2. Prepare and analyze a cash flow statement; Identify/apply the tools for evaluating a company's performance.
3. Create an Excel spreadsheet of selected accounting information, including formatting, calculating, and labeling of financial data.
4. Improve "test for understanding" skills with the instructor, to assure he/she is on track.
5. Make several oral presentations of homework problems to the class. Improve the following skills: learning, written communication, teamwork, deductive reasoning, and critical thinking.

COURSE DESCRIPTION:

This course focuses on the concepts of financial accounting which provides the information for use by investors, lenders, and other external organizations in evaluating the operations of a business enterprise. It is the responsibility of the student to read and understand the pre-assigned chapters and work the assigned questions, exercises and problems before the start of each session.

This class is based on Active Learning principles in which student questions and presentations complement instructor-facilitated discussions and mini-lectures. Students will work in teams on a daily basis. Instructor will introduce accounting topics with the comments/ideas of student teams.

Course Syllabus

Module 1 : Islamic Economics & Finance

This module provides an introduction to the concepts of Islamic economics and Divine Guidance in Islam for the development of an

free economy based on the principles of socio-economic justice.

- Lesson 1. Introduction to Islamic Economics
- Lesson 2. Divine Guidance for an Islamic Economy
- Lesson 3. Evolution of Islamic Interest-free Banking

Module 2 : Islamic Commercial Law & Contract

This module explains the Islamic principles and the modes used in financing and contracts, such as Qard, Dayn, Musharakah, Mudarabah, Kafalah, Hawalah, Jua'lah and Tawarruq

- Lesson 1. Early Contracts, Rules of Sales(Bai) and Evolution of Islamic commercial Law
- Lesson 2. Concept and Rules of Loan (Qard) and Debt (Dayn)
- Lesson 3. Concept of Partnerships: (Shirkah) Musharakah, and Mudarabah
- Lesson 4. Diminishing Musharakah
- Lesson 5. Credit Sales: Murabaha and Musawamah, Commodity Murabaha (Tawarruq)
- Lesson 6. Forward Sales: Salam and Istisna'a
- Lesson 7. Leasing: Ijarah as Financing Modes

Lesson 8. Accessory Contracts and Hibah (Wakalah, Jua'lah, Tawarruq, Kafalah, Rahn, Hawalah, Istijrar, Amanah, Wadiah, Hibah)

Module 3 : Islamic Banking Operations

This module provides an introduction to the conventional banking system and goes on to deal with the key operations

of conventional banks and co-operations, and the interaction between conventional and Islamic financial institutions.

- Outline of the Conventional Banking System
- Deposit and Resource Mobilization by Islamic Banks (Liability Side)
- Financing by Islamic Banks (Asset Side)
- Islamic Banks Services and Fee-based Operations
- Cooperation between Conventional and Islamic Banks

4 : Treasury and Capital Market Operations

This module deals with the Islamic Financial Markets, scope and instruments. It also discusses the concepts of venture capital, investment fund securitization and sukuk in accordance with Islamic principles.

- Islamic Financial Markets and Instruments
- Venture Capital under the Islamic Financial System
- Islamic Funds and Unit Trusts
- Securitization and Sukuk

5 : Regulation, Supervision and Corporate Governance and Financial Accounting of Islamic Banks

This module deals with governance and transparency issues in Islamic financial institutions, supervisory and regulatory issues, the role of the Shari'ah Board, Shari'ah compliance audit, accounting and taxation issues. It also provides guidelines for conversion of Interest-Based Banks to Islamic Banks.

Interest-Free Banking and the practical steps for establishing an Islamic bank

- . Corporate Governance, Regulation and Supervision
- . Shari'ah board, Compliance and related Supervisory Issues
- . Financial Accounting and Taxation Issues
- . Financial Statements of Islamic Banks
- . Practical steps for Establishing an Islamic Bank
- . Conversion of Interest-Based Banking to Islamic Interest-Free Banking

6 : Takaful - Islamic Insurance

This module explains Takaful and its rationale as an alternative to conventional insurance, the basic elements and models for takaful business (and Reinsurance)

- . Concept, Objectives, Basis of Takaful
- . Basic Elements and Operating Principles
- . Business Models of Takaful
- . Family Takaful Business
- . General Takaful Business
- . Retakaful or Reinsurance
- . Corporate Governance, Regulation and Supervision of Takaful

Textbooks.:

Reimers, Financial Accounting, 2007 Edition (Pearson/Prentice-Hall, 2007)

Financial and Managerial Accounting, 3rd Edition
Wild, Shaw and Chiappetta

Suggested Topics for Study / Discussion:

Unit –I

Meaning and Scope of Accounting,
Needs Development and Objectives

Definition of Accounting
-keeping and Accounting

Disclosures

Branches of Accounting

Terms used in Accounting

Accounting transactions

Accounting cycle

Book of Original Record: Journal

Rules of debit and credit

compound journal entry

Opening entry

Relationship between journal and Ledger

Rules regarding posting

Trial Balance;

Sub-division of journal [Subsidiary books]; Capital and Revenue; Classification of income

Classification of expenditure

Classification of receipt

Unit –II

Accounting Concept and Conventions

Preparation of Final Accounts with Adjustments: - Manufacturing accounts; Trading accounts; Profit & loss account; Adjustment entries

Balance sheet

Classification of errors

Location of errors

Rectification of error

Expense account

Effect on profit.

Unit –III

Depreciation Provisions and Reserves:

- Concept and causes of depreciation; Depreciation policy, Depreciation as per Accounting Standard – 4

Depreciation, Depletion and Amortization

Methods of providing depreciation

Depreciation of different assets

Depreciation of replacement cost

Depreciation Accounting

Provisions and Reserve

Sectional and self balancing system(s)

Accounts of non-trading institutions

Single Entry System

Insurance Claims: Insurance claims for loss of stock and loss of profit

Accounting principles

MATERIALS:

SUPPLIES:

Laptop computer

Calculator

Flash Drive for storing computer files

GRADING:

(Subject to override by Y.U. assessment standards)

Your final grade will be based upon your total points at the end of the semester.

Points will be assigned as follows:

Examinations (4 @ 60 points) 240

Homework 120

Serial Problems 30

Excel problems 40

Writing Assignments 30

Class Participation 40

Total points available 500

Grades will be assigned as follows:

90% + = A, 80-89% = B, 65-79% = C, 50-64% = D, Below 50% = F

TOPIC: BANKING
Sub-section: Definitions of Accounting

School of Continuing Education
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Definition

The systematic recording, reporting, and analysis of financial transactions of a business. The person in charge of accounting is known as an accountant, and this individual is typically required to follow a set of rules and regulations, such as the Generally Accepted Accounting Principles. Accounting allows a company to analyze the financial performance of the business, and look at statistics such as net profit.

Key definitions:

Accounts payable: Also called A/P, accounts payable are the bills your business owes to suppliers.

Accounts receivable: Also called A/R, accounts receivable are the amounts owed to you by your customers.

Accrual method of accounting: With the accrual method, you record income when the sale occurs, not necessarily when you receive payment. You record an expense when you receive goods or services, even though you may not pay for them until later.

Adjusting entries: Special accounting entries that must be made when you close the books at the end of an accounting period. Adjusting entries are necessary to update your accounts for items that are not recorded in your daily transactions.

Aging report: An aging report is a list of customers' accounts receivable amounts and their due dates. It alerts you to any slow-paying customers. You can also prepare an aging report for your accounts payable, which will help you manage your outstanding bills.

Allowance for bad debts: Also called reserve for bad debts, it is an estimate of uncollectable customer accounts. It is known as a "contra" account because it is listed with the assets, but it will have a credit balance instead of a debit balance. For balance sheet purposes, it is a reduction of accounts receivable.

Assets: Things of value held by the business. Assets are balance sheet accounts. Examples of assets are cash, accounts receivable, and furniture and fixtures.

Balance sheet: Also called a statement of financial position, it is a financial "snapshot" of your business at a given date in time. It lists your assets, your liabilities, and the difference between the two, which is your equity, or net worth.

Capital: Money invested in the business by the owners. Also called equity.

Cash method of accounting: If you use the cash method, you record income only when you receive cash from your customers. You record an expense only when you write the check to the vendor.

Chart of accounts: The list of account titles you use to keep your accounting records.

Closing: Closing the books refers to procedures that take place at the end of an accounting period. Adjusting entries are made, and then the income and expense accounts are "closed." The net profit that results from the closing of the income and expense accounts is transferred to an equity account such as retained earnings.

Corporation: A legal entity, formed by the issuance of a charter from the state. A corporation is owned by one or more stockholders.

Cost of goods sold: Cost of inventory items sold to your customers. It may consist of several cost components, such as merchandise purchase costs, freight, and manufacturing costs.

Credit memo: Writing off all or part of a customer's account balance. A credit memo would be required, for example, when a customer who bought merchandise on account returned some merchandise, or overpaid on their account.

Credits: At least one component of every accounting transaction (journal entry) is a credit. Credits increase liabilities and equity and decrease assets.

Current assets: Assets that are in the form of cash or will generally be converted to cash or used up within one year. Examples are accounts receivable and inventory.

Current liabilities: Liabilities payable within one year. Examples are accounts payable and payroll taxes payable.

Debit memo: Billing a customer again. A debit memo would be required, for example, when a customer has made a payment on their account by check, but the check bounced.

Debits: At least one component of every accounting transaction (journal entry) is a debit. Debits increase assets and decrease liabilities and equity.

Depreciation: An annual write-off of a portion of the cost of fixed assets, such as vehicles and equipment. Depreciation is listed among the expenses on the income statement.

Double-entry accounting: In double-entry accounting, every transaction has two journal entries: a debit and a credit. Debits must always equal credits. Double-entry accounting is the basis of a true accounting system.

Drawing account: A general ledger account used by some sole proprietorships and partnerships to keep track of amounts drawn out of the business by an owner.

Equity: The net worth of your company. Also called owner's equity or capital. Equity comes from investment in the business by the owners, plus accumulated net profits of the business that have not been paid out to the owners. Equity accounts are balance sheet accounts.

Expense accounts: These are the accounts you use to keep track of the costs of doing business: where your money goes. Examples are advertising, payroll taxes, and wages. Expenses are income statement accounts.

Fixed assets: Assets that are generally not converted to cash within one year. Examples are equipment and vehicles.

Foot: To total the amounts in a column, such as a column in a journal or a ledger.

General ledger: A general ledger is the collection of all balance sheet, income, and expense accounts used to keep the accounting records of a business.

Income accounts: These are the accounts you use to keep track of your sources of income. Examples are merchandise sales, consulting revenue, and interest income.

Income statement: Also called a profit and loss statement or a "P&L." It lists your income, expenses, and net profit (or loss). The net profit (or loss) is equal to your income minus your expenses.

Inventory: Goods you hold for sale to customers. Inventory can be merchandise you buy for resale, or it can be merchandise you manufacture or process, selling the end product to the customer.

Journal: The chronological, day-to-day transactions of a business are recorded in sales, cash receipts, and cash disbursements journals. A general journal is used to enter period end adjusting and closing entries and other special transactions not entered in the other journals. In a traditional, manual accounting system, each of these journals is a collection of multi-column spreadsheets usually contained in a hardcover binder.

Liabilities: What your business owes creditors. Liabilities are balance sheet accounts. Examples are accounts payable, payroll taxes payable, and loans payable.

Long-term liabilities: Liabilities that are not due within one year. An example would be a mortgage payable.

Merchandise inventory: Goods held for sale to customers.

Net income: Also called profit or net profit, it is equal to income minus expenses. Net income is the bottom line of the income statement (also called the profit and loss statement).

Partnership: An unincorporated business with two or more owners.

Post: To summarize all journal entries and transfer them to the general ledger accounts. This is done at the end of an accounting period.

Prepaid expenses: Amounts you have paid in advance to a vendor or creditor for goods or services. A prepaid expense is actually an asset of your business because your vendor or supplier owes you the goods or services. An example would be the unexpired portion of an annual insurance premium.

Prepaid income: Also called unearned revenue, it represents money you have received in advance of providing a service to your customer. Prepaid income is actually a liability of your business because you still owe the service to the customer. An example would be an advance payment to you for some consulting services you will be performing in the future.

Profit and loss statement: Also called an income statement or "P&L." It lists your income, expenses, and net profit (or loss). The net profit (or loss) is equal to your income minus your expenses.

Proprietorship: An unincorporated business with only one owner.

Reserve for bad debts: Also called allowance for bad debts, it is an estimate of uncollectable customer accounts. It is known as a "contra" account because it is listed with the assets, but it will have a credit balance instead of a debit balance. For balance sheet purposes, it is a reduction of accounts receivable.

Retained earnings: Profits of the business that have not been paid to the owners; profits that have been "retained" in the business. Retained earnings is an "equity" account that is presented on the balance sheet and on the statement of changes in owners' equity.

Sole proprietorship: An unincorporated business with only one owner.

Trial balance: A trial balance is prepared at the end of an accounting period by adding up all the account balances in your general ledger. The debit balances should equal the credit balances.

Unearned revenue: Also called prepaid income, it represents money you have received in advance of providing a service to your customer. It is actually a liability of your business because you still owe the service to the customer. An example would be an advance payment to you for some consulting services you will be performing in the future.

DIVISIONS WITHIN ACCOUNTING SERVICES

The Accounting Services Units and their respective responsibilities work together with other offices to accomplish improvement of services to students, faculty, staff and other customers in compliance with the executive orders as outlined by the California State University System.

ACCOUNTS PAYABLE/ACCOUNTS RECEIVABLE

Accounts Payable is responsible for paying all vendors for goods and services provided to the University. Accounts Payable personnel process vendor payments, maintain files of open orders and invoices and respond to vendor questions. They also process travel applications and claims, and provide travel and moving information to the campus community. They also coordinate the credit card purchase activity, and process 1099 and sales tax returns. On the receivable responsibility, staff are responsible for all non-student receivables: issuance of invoices, collection and reporting.

FINANCIAL REPORTING

Financial Reporting is vested with technical accounting functions including GAAP audit coordination and statement preparation, Unrelated Business Income Tax and Non-Resident Alien Income Tax issues. Other multitudes of responsibilities include maintenance of the General Ledger and preparing monthly, quarterly and year-end financial reports, and various reconciliations. Financial Reporting also maintains the chart of accounts, and cash accountability for investment of funds and assists with and responds to external and internal audits for both legal and GAAP based accounting and audit requirements.

The Financial Management Service (FMS) provides a full range of financial reporting and accounting services that meet strict Federal financial management system requirements and applicable Federal accounting and transaction standards.

FMS uses the Unified Financial Management System (UFMS), an online, real-time application that accepts both manual and electronic input. UFMS enables customers to perform accounting edits and validations and produces accounting transactions for general and subsidiary ledgers.

Services offered include:

- Accounting for all costs, obligations, disbursements, advances, receivables, and expense and revenue accruals
- Administrative control of funds
- Preparation of financial statements, supported by an array of standard and customized reporting

- Hard-copy reports
- Online reports from which data can be accessed via the Web and downloaded to an Excel spreadsheet for local use
- Extensive online query capabilities
- Assistance with financial problem solving and program design

The Division of Cost Allocation (DCA) provides negotiation services for indirect cost rate proposals and cost allocation plans. For more than 40 years, DCA has reviewed cost allocation methods and practices of entities that receive Federal funds, helping to ensure that indirect costs paid by the Federal Government are fair, equitable, and in accordance with Federal regulations.

Services offered by DCA include:

- Review and negotiation of indirect cost rates for colleges and universities, hospitals, nonprofit organizations, and State agencies
- Review and negotiation of statewide cost allocation plans and public assistance cost allocation plans, fringe benefit rates, research patient care rates, and special rates
- Resolution of audit findings on cost allocation plans and indirect cost rates
- Provision of technical assistance and guidance on matters relevant to cost allocation methods affecting grant programs through personal contact or through DCA's Web site
- Provision of recommendations on improving grantee accounting systems to support cost allocations
- Provision of operational assistance in developing Government-wide and Department-wide accounting policies, procedures, and regulations, offered to all Federal Agencies

Services offered include:

- Account maintenance
- Credit card processing
- Custom letters, account statements, and billing statements
- Lockbox facilities
- Referrals:
 - Delinquent accounts to commercial debt collection agencies
 - Health profession claims for exclusion from participation in Medicare and Medicaid
 - Debts to the U.S. Department of Justice (DOJ) for enforced collection
 - Debts to the Treasury Offset Program (TOP) for administrative offset
 - Debts to Treasury for cross-servicing
- Reporting of debts to credit reporting agencies
- Report preparation, both regulatory and ad hoc
- Internal Revenue Service (IRS) 1099C, Cancellation of Debt, and 1098E, Student Loan Interest Statement, reporting

The PMS provides awarding Agencies and Grant recipients the tools to manage grant payment requests, draw-downs, and disbursement reporting activities. Flexibility within the PMS, matched with the professional competence of DPM staff, provides Federal Agencies an efficient and effective means of managing grant payments. Awarding Agencies may designate the level of oversight to be provided for a specific grantee's payment requests – from “self-serve” to accounts that are closely monitored.

Services offered include:

- Self-serve or monitored grant draw requests

- Next-day payments through the Treasury Automated Clearing House
- Same-day payments for emergencies or special circumstances
- Foreign payments (deposited to U.S. bank accounts)
- Cash management services that support the Cash Management Improvement Act
- Professional grant accounting support services
- PMS Web access:
 - Drawdown requests
 - Disbursement reporting
 - Payment and disbursement report monitoring
 - Reports and queries
 - News and information
 - Contacts, addresses, and telephone numbers
- Personalized account liaison services
- Help Desk support
- PMS training
- Collection services on overdrawn grants, disallowed costs, and excess interest
- Audit support (SAS-70 and requests for information)

Additional Services offered include:

- Payroll reconciliation
- Systematic interface for payroll accounting information needed to account for disbursements, obligations, and accruals for personnel costs
- Collection and disbursement of payroll items such as income taxes and unemployment benefits, and reporting of those items to Treasury, States, the Internal Revenue Service, and the U.S. Department of Labor
- Preparation of SF-224, the monthly Statement of Transaction, and a variety of Payroll and annual Departmental Pension reports

DISCLOSURES COMPONENT

Summary:

This document provides guidance to banks and banking supervisors on recognition and measurement of loans, establishment of loan loss allowances, credit risk disclosure and related matters. It sets out banking supervisors' views on sound loan accounting and disclosure practices for banks. The document also serves as a basic framework for supervisory evaluation of banks' policies and practices in these areas. It may also be helpful to accounting standard-setters.

Various international bodies, including the Basel Committee, have called for progress in accounting and disclosure practices for banks' lending business and related credit risk. Accounting treatments generally, and loan accounting treatments specifically, can significantly affect the accuracy of financial and supervisory reporting and related capital calculations. Moreover, sound accounting and disclosure practices are essential to ensure the enhanced transparency needed to facilitate the effective supervision and market discipline of financial institutions. In addition to the Basel Committee, the G7 Finance Ministers, G10 central bank Governors and international financial institutions such as the International Monetary Fund and the World Bank have called for progress in this area.

The paper begins by stating the overall objectives of the Basel Committee in addressing the topic of sound practices for loan accounting and disclosure. It summarizes key terms and ties this guidance to the

credit risk management process. The paper then provides guidance on sound practices with respect to key loan accounting issues, such as the initial recognition and measurement of loans, subsequent measurement of impaired loans, the establishment of loan loss allowances, and income recognition. Moreover, the paper presents sound disclosure practices focusing on the credit risk in the loan portfolio. The paper also includes a brief discussion of the role of supervisors in assessing a bank's management of asset quality and the adequacy of loan loss allowances.

Four primary concerns of supervisors regarding loan accounting and disclosure are a) the adequacy of an institution's process for determining allowances, b) the adequacy of the total allowance, c) the timely recognition of identified losses through either specific allowances or charge-offs and d) timely and accurate credit risk disclosures.

The publication of this paper is a component of the Committee's long-standing work to promote effective banking supervision and safe and sound banking systems. It complements the Basel Core Principles in the field of accounting and disclosure for banks' lending business and related credit risk. International implementation of the guidelines in this paper should help achieve enhanced bank accounting policies and practices, which are consistent with sound risk management practices, in both G10 and non-G10 countries, as well as increased convergence of such policies and practices across banks and countries.

BRANCHES OF BANKING /ACCOUNTING COMPONENT

Overview: Financial accounting refers to accounting for revenues, expenses, assets, and liabilities. It involves the basic accounting processes of recording, classifying, and summarizing transactions.

- Cost accounting is the branch of accounting dealing with the recording, classification, allocation, and reporting of current and prospective costs.
- Managerial accounting is the branch of accounting designed to provide information to various management levels in the hospitality operation for the purpose of enhancing controls.

How communication place important role in the progress of an organization?

What is flow unchecked?

What are the points you will keep in about the concept of quality and inspection if you are the quality system manager of a banking firm?

What are the points you will keep in about the concept of quality and inspection if you are the quality system?

BASIC PRINCIPLES OF "BEST PRACTICES" of BANKING ACCOUNTING

(Contributing Authors: Eivind Hoffmann, Mary Chamie, ConEd Staff)

Summary:

The following describes best practices for the development, use, maintenance and revision of international standard statistical classifications (ISC); and the corresponding derived or related national (NSC) and multinational statistical classifications. Attention is drawn to the need to:

- (1) state goals and problems clearly;

- (2) identify the actors involved in the development and use of classifications (producers and users of statistics);
- (3) identify the injunctions which follow from legislation and government policies;
- (4) describe how the structure and details of the classification are used when producing and presenting statistics;
- (5) understand the use of statistics produced with the classification;
- (6) establish monitoring mechanisms for proper feedback from classifications users about problems in its use;
- (7) maintain a time table to draft, update or revise the classification;
- (8) coordinate the process with work on other classifications;
- (9) set standards for dissemination of the classification and its related updates and revisions.
 - The principles and standards of research methodology and statistics should be applied when classifications are designed, tested, used, updated and revised. Clarity in terminology, concepts, definitions and structure are required for satisfactory results.
 - National (NSC) and international statistical classifications (ISC) are mutually dependent.
 - The existence of an ISC which reflects the best practices and understanding of its subject matter area will facilitate greatly the work to revise or develop corresponding NSCs. In order to be able to serve this function the ISC will depend on the experiences gained from the development and use of NSCs. This is why a presentation of basic principles for standard statistical classifications has to cover both NSCs and ISCs.

Supplemental Materials and Suggested Course Descriptors

A. Classification standards and methods

1. *Classifications* group and organize information meaningfully and systematically into a standard format that is useful for determining the similarity of ideas, events, objects or persons. The preparation of a classification means the creation of an exhaustive and structured set of mutually exclusive and well-described categories, often presented as a hierarchy that is reflected by the numeric or alphabetical codes assigned to them.

2. Classifications may be constructed to support the implementation of regulatory policies such as customs regulations or criminal legislation. They are also used to standardize concepts of public services such as job placement, education, welfare or public health and to describe social, economic or natural phenomena. When in general use these classifications are called *standard classifications*; and *standard statistical classifications* represent a subset used to organize and present statistics. When adopting or adapting a standard classification for statistical use, further methodological work may be required.

A *statistical classification* is a classification having a set of discrete categories, which may be assigned to a specific variable registered in a statistical survey or in an administrative file, and used in the production and presentation of statistics. Thus the categories "male" and "female" constitute a classification for the variable "sex", which can be observed for humans as well as for many other living organisms.

A.1. National statistical policy National custodians of classifications

The responsibility for the collection and dissemination of official statistics normally rests with a country's national statistical authorities. This responsibility normally also includes the development and use of *national statistical classifications (NSCs)*. Thus the statistical agency will

act as the *custodian* of the NSCs, responsible for planning activities to train users of the classification, for updating and/or revising the classification, as well as for ensuring that the necessary funds can be made available for this work. The custodian of a classification has to hold the necessary expertise in the relevant subject matter areas and develop a network of technical advisers who are both producers and users of statistics. The network necessary for preparation of a new classification or for revision, is often organized through a national coordinating committee.

A.2. International statistical policy

International standard classifications are developed and adopted by international institutions to ensure correct implementation of agreements and to standardize national and international communication.

(See “Preamble: Family of International Economic and Social Classifications” for definitions of the types of statistical classifications and for a description of the roles agencies have for the maintaining, updating and revising statistical classifications (ESA/STAT/AC.63/18), a paper prepared by Mary Chamie, UNSD for the Fourth Meeting of the Expert Group on International Economic and Social Classifications, New York, 2-4 November 1998.)

International custodians of classifications *International statistical classifications* (ISCs) are products of international agreements among national authorities responsible for statistics in the respective areas. In accordance with the established practices for the division of responsibilities among international agencies in the area of statistics, the ISCs require approval by the United Nations Statistical Commission (UNSC) or another competent intergovernmental board, such as that of the World Customs Organization (WCO), the World Health Organization (WHO), the International Monetary Fund (IMF), or the International Labor Organization (ILO), depending on the subject matter area. ISCs may serve as models for the development of corresponding national, multinational and regional statistical classifications (NSC), and should, as far as possible, reflect what is considered “best practice” in the substantive areas they cover. Therefore ISC’s are international *reference* classifications. Custodians of ISCs are usually international agencies.

A3. Principles of statistical classifications:

Statistical classifications are developed or revised on the basis of established practices and principles, i.e.:

The organization responsible for the preparation and maintenance of a classification (the custodian) should be clearly identified and responsibilities stated;

A time table for the work must be well publicised and allow substantive experts who are users and producers of statistics, to contribute to the process at appropriate moments; analytical needs, aggregated categories of statistical classifications may be organized in a hierarchy representing different levels of detail for measurement of the variable.

e. Descriptive definitions or exhaustive listings of the contents of the defined categories are needed. Listings will not be needed for aggregate groups when the codes are constructed to make transparent where the correspondent groups are located in the hierarchical structure.

f. Instructions are needed on effective use of classifications for data collection and analysis; World Customs Organization *The Harmonized Description and Coding System, 1996 version* (Brussels, 1996), WCO Sales No. 101.

World Health Organization *The International Statistical Classification of Diseases and Related Health Problems, tenth revision* [ISBN 92 4 115 4419.8 (Vol. 2), 21.X (Vol 3)]. Geneva, 1993.

World Health Organization *International Classification of Impairments, Disabilities and Handicaps* (ISBN 92 4 154126 1 Order number 11 500 88), Geneva, 1980.4

Guidance and training materials are a necessary part of the development process for a new or revised classification.

Sufficient resources will not necessarily be available to fully adhere to all principles for the development and implementation of statistical classifications at the national and international level.

Guidance on how to set relative priorities between the principles may therefore be needed. These priorities may vary between classifications, over time and between countries.

A.4. Use of statistical classifications for policy decisions and implementation:

many classifications. For example, there is a strong link between the *Harmonized System (HS)* and customs regulations and agreements³. There is also a strong link between the classification of diseases and death in the *International Statistical Classification of Diseases and Related Health Problems (ICD)*, and the formulation of prevention and treatment programmes⁴. The categories of the ICD may also be used to determine the scope of insurance schemes or may be used to identify people who qualify for services or compensation. For example, a cause of death classified as suicide may be compensated differently by insurance programs than a death classified as accidental, although the immediate cause of death may be the same.

The categories specified for a classification must be regularly evaluated for possible legal and policy implications, even when the classification has been designed to serve as a descriptive tool only. Classifications which are to be applied to people, for example, must consider issues of human rights. Possible positive and negative implications of classifications and their use must be monitored. For example, during the development of the *International Classification of Impairments, Disabilities and Handicaps (ICIDH)*⁵, some persons with disabilities and their families reported feeling that they had been improperly singled out for blame, or for discrimination, through the use of the classification. This problem of interpretation and use resulted in some national disability surveys being postponed until the language of the classifications and the concepts upholding them could be modified to meet the needs of changing policy and modified interpretations of disability states.

Regular hearings should be conducted and opportunities offered for discussions with major users of classifications, so that their needs are well understood and appropriately reflected when developing, using and up-dating classifications. Representatives of institutions or groups of people who will be classified may be asked to participate in hearings on the classification, so that their perspectives are heard on the classification and its use for statistics and other purposes.

Classifications developed primarily or exclusively for the production and presentation of statistics may be utilized also for other purposes. When they are used e.g. for legal purposes, cautionary notes are required. If a legal text or a contract refers to a statistical classification, or groups defined therein, those who prepared the text should be fully responsible for the practical consequences. It should be their task, and not that of the custodian of the statistical classification, to explain and answer for its use in the legal context.

B. The meaning and means of harmonization

The objective of harmonization of statistics is to make it possible to combine or compare data that have been collected for different populations, for different periods and/or by different data collection methods or statistical units. This can be made possible through the use of the same or mutually consistent and harmonized standards and classifications across different data sets. If this has not been done, or is not possible, then one may attempt to achieve a reasonable degree of comparability across different standards and classifications by making the explanation of differences and similarities part of the analysis which involves such data sets.

Harmonization of statistical classifications should be a function of the specific descriptive and analytical objectives which it is intended to serve. It involves the establishment of mutually consistent categories for the same or for closely related variables, where some of the dividing lines between categories in the different classifications can be approximately the same. For example, those wanting to calculate unemployment rates for different age groups may find that the definition of the *age* variable is different in the two sets of statistics (one using *year of birth* and the other using *age at last birthday*), and that the age groups used for the statistics on *unemployed* are different from those used for the *total labour force*.

Harmonization of statistical classifications will require a process of reconciliation of the different classifications and statistical standards into a common framework, maximizing the correspondence between them. This includes the use of common concepts and terminology, as well as the establishment of coordinated and agreed tables of correspondence between the categories of the different classifications, or through the identification of common detailed building blocks for these categories.

In the case where different classifications cover the same variable, harmonization requires a clear understanding of the basis for and the nature of the differences, as well as whether and how these correspond to different user needs. To move towards one common, reconciled classification will normally require a certain amount of adjustment relative to all the relevant existing classifications; and/or giving priority to some statistical applications or users, while explaining how others can be served even by a classification which is less tailor-made to their needs.

Suggested readings:

United Nations. *International Standard Industrial Classification of Economic Activities, Third Revision*, Statistical Papers, Series M, No. 34, Rev. 3 (United Nations publication, Sales No. E.58.XVII.7).

United Nations. *Central Product Classification (CPC) version 1.0*, Statistical Papers, Series M, No. 77, Ver. 1.0 (United Nations publication, Sales No. E.98.XVII.5).

United Nations, Educational, Scientific and Cultural Organization: *International Standard Classification of Education (ISCED 1997)*. Paris. November 1997.
International Labour Organization: *International Standard Classification of Occupations (ISCO-88)* (ISBN92 2 306438-4). Geneva, 1990.

When working toward harmonization of different statistical classifications, those responsible for the classifications involved should work together in the revision of the respective classifications, or collaborate through a regular exchange of information, so that the work may

result in an established system of reference, derived and related classifications. Duplication of effort can be reduced through coordination and cross-participation in advisory committees or working groups.

Harmonization of classifications requires regular exchange of information between the custodians of the relevant classifications. Without such exchange, different interpretations of similar concepts and categories will occur.

A classification should not be amended without taking into account the possible effects on other statistical classifications. Amendments may also affect analysis that depends upon using the classification over time. A standardized procedure is needed for announcing plans for change, with sufficient time for the custodians and users of other classifications and of the relevant statistics, to determine the implications for themselves.

B.1. Reference, derived and related classifications

In the process of harmonization, statistical classifications may be described as reference, derived or related. Reference classifications are those that have achieved broad acceptance and official agreement and are approved and recommended as models for the development or revision of corresponding classifications, both with respect to the structure and with respect to the character and definition of the categories. International statistical classifications are reference classifications when they are a product of international agreements through approval by the UN Statistical Commission or another competent intergovernmental board, such as those of the WCO, the WHO, the IMF, UNESCO or the ILO, depending upon the subject matter area.

(Note to instructor☺)

The *Harmonized Commodity Description and Coding System (HS)*, the *International Standard Industrial Classification of All Economic Activities (ISIC)*⁶, the *Central Product Classification (CPC)*⁷, the *International Standard Classification of Education (ISCED)*⁸, and the *International Standard Classification of Occupations (ISCO)*⁹ are reference classifications and are recognized by the United Nations "International Economic and Social Classifications, Report of the Secretary-General to the Statistical Commission, 29th session, 10-14 February 1997" (E/CN.3/1997/4).

Eurostat. *NACE Rev. 1.: Statistical Classification of Economic Activities in the European Community* (ISBN 92-826-8767-8) Luxembourg, 1996.

¹²Eurostat: *ISCO-88(COM)*. Luxembourg 1995. (Mimeographed).

¹³ Economic Classification Policy Committee (1996): Federal Register, Part III, Office of Management and Budget, July 5 1996. as such in the family of international economic and social classifications adopted at the Second Meeting of the Expert Group on International Classifications.

Derived classifications are based upon the corresponding reference classifications. The groups in the derived classifications have been obtained by re-arrangement and/or sub-divisions of items from one or more reference classifications. Examples of derived classifications include the *General Industrial Classification of Economic activities within the European Communities (NACE)*¹¹, which is based upon ISIC; and ISCO-88(COM) developed for Eurostat on the basis of ISCO-8812.

Related classifications are classifications that provide a set of organized categories for the same variable(s) as the corresponding reference classification, but for which the categories may only partially refer to those defined in the reference classifications, or that may only be associated with the reference classification at specific levels of the structure. For example, the *North American Industry Classification System (NAICS)* stated as one of its goals, to be related to

ISIC, by being compatible with it at the 2-digit level¹³.

National adaptations of ISCs may be derived or related. NSCs that are *derived* from ISCs will use the same structure, yet in defining detailed categories will go beyond the existing ISC structure. They may also truncate part of the ISC structure in areas which are not relevant for the NSC. This is what NACE has done on the basis of ISIC. NSCs that are *related* to the corresponding ISC, might follow part of its structure, but would diverge from it in some respects, like NAICS by only following ISIC at the two-digit level.

Procedures for revision and updating of statistical classifications should encourage the resolution of problems of incomplete correspondence to other reference classifications, and offer opportunities for increased harmonization.

B.2. Correspondence and links across classifications

The extent of correspondence and harmonization possible between different classifications depends on the degree to which the various categories are the same, and on the 14 Commission of the European Communities, International Monetary Fund, Organization for Economic Cooperation and Development, United Nations and World Bank, *System of National Accounts, 1993* (United Nations publication, Sales No. E.94.XVII.4).

UNESCO (1997) *International Standard Classification of Education COM/ST/ISCED*, Paris 1976
Households can have expenditures which can be classified by COICOP as being for education. However, most households will not be producing units according to SNA criteria. This means that the conceptual links which can be established between them. For example the four international statistical *classifications of expenditure according to purpose*, i.e., COFOG, COPNI, COICOP and COPP are all concerned with the same type of variables, namely *expenditures according to purpose*.

However, their scopes are different, if partly overlapping, because each scope has been defined in terms of the purpose of the expenditures made by a particular type of institutional unit, as defined in the *System of National Accounts (SNA)*, namely: government; non-profit institutions serving households; households and producers respectively.

Together the scopes are intended to cover all possible types of units having economic transactions, and therefore also the purpose of all transactions considered as ‘economic’ according to the total scope of the SNA. The differences in scope have led to some differences in the defined sets of categories for “purpose”, as these have been tailored to suit the analytical and descriptive objectives for the different scopes. For example, all these classifications identify education and training as one type of purpose of expenditure; however, the goods and services actually bought are different to a large extent. In the case of household consumption the expenditures are for purchasing of educational services for individual household members; in the case of government, it would be stated in terms of expenditures (outlays) for educational services at the institutional level.

Education and training is also the defined scope for ISCED15, but there the definition is formulated without any reference to the scope of SNA, as “all organized and systematic activities designed to bring about learning”, which means that the statistical units of the classification are *educational programmes*. Correspondence between e.g. COFOG describing government *expenditures* on education, and ISCED describing educational *programmes*, requires: (i) that the set of expenditures classified by COFOG can be nested within the ISCED scope of

educational programs; (ii) that links between the units of COFOG (economic transactions) and ISCED (activities or programs) can be defined and identified; and (iii) that the set of categories defined for sub-dividing the education and training expenditures in COFOG is compatible with the distinctions made in ISCED for educational activities.

Similarly ISIC, Rev.3 has a tabulation category H *Education* covering all *economic activities of education*, which may have a scope compatible with the classifications of expenditure according to purpose¹⁶, as it is also bounded by the SNA, and which may be nested within the combined scope of the purpose classifications will be larger than the scope of ISIC, even after the defined scopes of categories have been coordinated.

Source:

E. Hoffmann: "Mapping a national classification of occupations into ISCO-88: outline of a strategy". Chapter 23 in Chernyshev, I., ed.: *Labour Statistics for a Market Economy*. Central European University Press. Budapest, 1994.

Note to Instructor:

ISCO-88 has categories for jobs for which conducting education of various types are the main tasks, but with only indirect, i.e. terminological, references to ISCED categories when defining their scope. However, ISCO-88 makes explicit reference to the ISCED value set of educational categories when defining *skill levels*, a major organizational feature of its structure.

B3. Building blocks

Building blocks are the most elementary units of a statistical classification, i.e. the characteristics that are identified with most detailed codes which may be assigned for a variable, and may be used alone or in combination to describe a category in a classification, or to compare classifications.

Harmonization through methods of correspondence and linking will mean to increase the degree of resolution to a level where it will be possible to establish direct links between the detailed groups (the "building blocks") of the classifications. Such building blocks may have to be created as sub-divisions of their existing most detailed level.

Whenever possible, similar coding of categories should be used across reference and derived classifications. But this should not become an obstacle for development of variations. NACE Rev. 1, for example, has the same codes for divisions as ISIC Rev.3. But, because of the needs of the European Community, they have elaborated additional categories, or detail, beyond that available in ISIC Rev. 3 at the lower levels. Most important, however, is that the most detailed categories of NACE can be combined so as to reconstruct the detailed levels of ISIC.

B.4. Mapping national classifications to international standards

National classifications may be mapped into international classifications for the following reasons:

- a. To make comparisons between national circumstances and circumstances of other countries;
- b. To communicate information with persons or institutions in other countries.

(Note to instructor:) See *Hoffmann (1994), op.cit* for more detailed explanations tailored to classifications of occupation.

Linking to a common reference classification:

When only two countries are involved, the need for comparable information can be satisfied most effectively by directly linking their national classifications. However, as soon as more than two countries are involved, pair-wise linking becomes inefficient. Even if most comparisons are expected to be pair-wise, it may be more efficient to use the indirect route of linking to a common international reference classification in order to avoid having to establish many pairwise links.

Linking at the detailed level:

Mapping one classification into another, at the most detailed level, is equivalent to determining for each group in the first classification the most appropriate corresponding group in the other. The first step when establishing links should always be to give to the most detailed groups of one classification the code of the most detailed appropriate group in the other. This means that, when needed, the groups of one classification can be aggregated to most of the relevant aggregate groups of the other. In establishing links between ISCO-88 and the earlier version ISCO-68 this was done by giving the codes of both versions to each entry in their joint index of occupational titles. This double coding provides the basis for one-to-one links between those groups in the two versions for which this is appropriate. In a large number of cases this will be for detailed groups in both versions, but in some cases even the detailed categories in one have to be split to ensure that all units classified to that group will be correctly classified to the other version, because of the different similarity criteria used.

Achieving international comparison:

When international classifications differ from the national classification, international comparison may be achieved by regrouping statistics obtained under national classifications to the international standard classification. In order to do this, all the elements required for such an arrangement need to be obtainable from national statistics.

Quite often the problem is that when statistics are not available for groups defined at the most detailed level of an NSC, it is still necessary to establish links from the national statistics to statistics organized according to the corresponding ISC. In other cases, neither the structures nor the detailed levels can be directly linked. In both cases the first step in a linking process would be to look at the structure of the most detailed NSC groups for which data are available in terms of their component international groups. On this basis one should determine how one or the sum of several such NSC groups could be used as a reasonably close approximation to the ISC group for which statistics are needed¹⁸. In terms of closeness of approximation, this procedure evidently will give results which are much less satisfactory than those resulting from aggregating statistics directly from detailed national groups in a way which corresponds exactly to those defined in the ISC.

C. The role of coordination

Coordination of national and international work on classifications is conducted through the formation and action of committees and joint meetings, as well as through the implementation of well-publicized timetables and hearings to facilitate the participation by a wide range of producers and users of statistics in the preparation, design, implementation and monitoring of statistical classifications.

C.1. Role of committees, task forces and commissions

A broad range of interdisciplinary consultations should take place prior to any initial

drafting of a statistical classification. The initial draft is usually prepared by a small team, sometimes assisted by a drafting committee comprised of 5-10 members or by individual experts on specific subject matter aspects. This small team, or task force, in the custodian organisation may also be supported by correspondents, hired consultants and an advisory committee. The drafting committee and/or an advisory committee will usually have specialists covering statistics, terminology, standards, policy and relevant subject matters, e.g. medicine for ICD, customs officers and the various industries and products for HS.

In the process of developing the proposal for development of a classification, and when setting up the team preparing the classification, it is essential to define precisely the role of various actors. For example in the case of an international statistical classification, the United Nations, its specialized agencies, inter-secretariat working groups, Member States, task forces, collaborating centres, nongovernmental and/or scientific organizations may be asked to contribute in ways which should be clearly described.

When the work programs of statistical offices are reviewed, either nationally or internationally, it is essential that there be an integrated presentation and discussion of the work with classifications to facilitate the regular exchange of information, regarding their preparation, implementation and revision, and to encourage harmonization.

Committees submit their proposals for the development of classifications to the responsible agencies for official review and approval. In the case of international classifications, proposals may be brought to the United Nations Statistical Commission either as a point of information, when the custodian is an international body such as WHO, ILO or UNESCO, or they may be submitted to the Statistical Commission for approval, prior to being published and circulated world-wide.

United Nations (1978). *The Harmonization of Statistical Classifications*, Report of a meeting of an Expert Group, 29 May 1975, ST/ESA/STAT/78, para. 15.

20Suonuuti Heidi (1997) *Guide to Terminology*, NORTERM Publication No. 8.

C.2. Role of national statistical offices in the development and use of international statistical classifications (ISC):

The experiences of national statistical offices are important as basis for the development and implementation of international statistical classifications. Effective national practices provide the foundation for ISCs. Thus, if there is a reasonable agreement on 'best practice' among the national statistical institutions (NSIs) with relevant experience, it is best to adopt the corresponding general principles and common definitions for the ISC, as well as for the NSCs for which the ISC will serve as a model. This limits the need to create complex correspondences between national and international classifications to those warranted by specific national circumstances.

Once developed (or revised) the ISC may be used as model for the development or revision of the corresponding NSCs. This may mean that the developers and custodians of the NSCs will further elaborate categories of the ISC by subdividing them into as many subcategories as seem relevant for the national situation and needs for detailed statistics. This can be done by extending the relevant international code. In order to preserve comparability, the more detailed categories should be delineated so that they may be aggregated back to the original code that was subdivided.

Few NSCs will have equal need to use all categories of an ISC. Categories of ISCs may

therefore be contracted or combined into fewer, less detailed classes for national purposes, e.g. when the detailed categories are not important or do not exist, or due to fewer specialization requirements. However, in order to make a national classification convertible to the international, the categories at the most detailed level of an NSC should coincide with, or be subdivisions of, categories found in the corresponding ISC.

Where a national classification category has been created as a combination of two or more categories of the ISC, these should belong to the same aggregate group in the ISC.

When translating the group titles and the terminology of an international standard classification into a national language, it is important to remember that it is the concepts, rather than the words themselves, that are being translated. Translation of classifications should never be simply a direct transfer of the words of the ISC to the other language.

The translation requires a comparison, or transfer of the concepts systems themselves, between the different languages, and this will require that both language and subject matter experts are involved in the translation, in particular as it may require the creation of new terms in the national language, or the specification of more precise meanings for existing terms. Such innovations should always be as consistent as possible with the existing conventions for the national language.

C.3. Setting presentation standards for classifications comparisons

The use of standardized conventions for drafting descriptions, for layouts and for coding structures will help in comparing classifications. Priority would be given to editorial standards for preparing the titles of categories, for the representation of the “not elsewhere classified (nec)” and “not further specified” categories, and for writing notes that explain what is included and what is excluded from any classification category. Such explanatory notes should also document the reasons for choices made in the interpretation for specific cases of the general principles.

Standard executive summaries stating the purpose, scope, basic structure and primary measurement units of the classification, as well as its current revision status, are usefully published as part of the classification itself, and expedites the use of classifications by a diverse set of researchers. An illustrative example of an executive summary in an established format is provided in Annex 1 of this report.

D. Uses of classifications

Statistical classifications are used for a variety of purposes, such as:

- a. The collection of information and/or organization of information already collected;
- b. Aggregating and disaggregating data sets meaningfully for purposes of complex analysis, including the construction of indexes; e.g. the use of COICOP for describing the basket of individual goods and services purchased by households and used for standardizing estimates in the calculation of the Consumer Price Index;
- c. The construction of a classification for a different variable on the basis of the classifications for two or more component variables; e.g. *the socio-economic status classifications* which typically have categories defined by reference to categories found in classifications for occupation, status in employment, industry, size of enterprise and/or educational attainment.

d. Presenting statistical information;

e. Reference classifications are used as models for the development or revision of related classifications, e.g., ISCs for NSCs, both with respect to the structure and with respect to the character and definition of the categories. This method is used in the development and revision of statistical classifications in the United States,

Note to instructor)

See: *Federal Register Notice* of July 1, 1997 concerning the revision of the *Standard Occupational Classification (SOC)*.

The basic categories of classifications may be aggregated according to alternative frameworks or sets of similarity criteria, e.g. to facilitate other forms of analysis than those given priority by the standard structure. This can be done by adding alternative similarity dimensions or criteria to the descriptions of the most detailed categories. For example, in economic statistics, an output of economic activity, or a product, might be described as either a service or as a good, depending upon the analytic framework used for the analysis. Thus it would be useful to keep the description of the product independent of a particular distinction between a good or a service.

Products could then be differently arranged according to the requirements of different theoretical frameworks or analyses, and through regrouping of the codes into groups of goods and services based upon the criteria for making this distinction, which may differ between analytical frameworks. A product might then be described as a good in one framework, and as a service in another. Under such conditions, the product compositions of the groups *goods* and *services* will be the same for classifications using the same framework, and their statistics would be comparable; but across frameworks they would not.

E. Methodological issues when developing a classification

Three types of methodological issues must be addressed when developing a statistical classification, or when adapting an international statistical classification for national use: (a) issues related to the identification of users' requirements; (b) conceptual issues; and (c) issues related to the collection of the information necessary to develop the classification.

E.1. Determining users' requirements

This involves determining both *who* the users are and *how* they will be using the classification, or the statistics produced with its help. (i) Aiming to answer *how*, one may find that some users need statistics according to the classification to determine who and how many will be impacted by policies or programs being considered; others need these statistics to implement policies; and others want to monitor the consequences of policies and programs. (ii) Aiming to answer *who are the users* may require instigating a search.

One search method is to advertise in one form or another that one wants to receive relevant comments from users of statistics who are using the classification²¹; another is to contact institutions or individuals who, because of their responsibilities are likely to be using the classification in a reflected way; a third way is to say that one need not concern oneself with other users than those which already have made themselves known, or who were acknowledged in the development of the NSC/ISC. The last approach is the least preferable because it may result in overlooking important users whose needs become apparent at a later stage when their input cannot be so readily

accommodated by classifications committees.

E.1.a. Determine what different users would like the classification to do:

This involves determining users' requirements with respect to both the detailed and the broad distinctions which needs to be made among the categories to be described with the help of the classification. One method is to ask a sample of different users to provide specifications; another is to ask them to provide comments to alternative models or drafts for the classification structure. The latter strategy is normally the most effective.

5.1 B User requirements:

Different users' requirements may have to be balanced against each other or a choice may have to be made between them when they are contradictory. Some differences in users' requirements can be accommodated when constructing the classification, e.g. by making more detailed distinctions than required by any of the users, from which different broader categories can be constructed. Other differences cannot be resolved, and a choice may have to be made to give priority to the needs of some users over those of others. In either case it is necessary to explain to users the implications of the solutions reached and the choices made.

The scope of a classification is described by defining the boundary of the total set of categories defined, e.g. the scope of both ISIC and ISCO is given by the definition of the economic production boundary in the *System of National Accounts (SNA-93)*. Extending the scope of a classification requires extending the conceptual boundary. In the case of ISIC and ISCO, this would require expanding the scope to activities and occupations that are outside the currently defined production boundary of the SNA. It is important to note that as long as new cases can be accommodated by being placed within existing categories, or by adding more detailed subcategories to existing categories; then the set of defined categories of the classification has not changed; the content of the categories has just been further elaborated.

Conceptual issues:

There are formal steps that must be taken in order to prepare a standard classification so that it may be a statistical classification used in surveys and registries. The main conceptual issues when developing a statistical classification are:

The *International Standard Classification of Occupations (ISCO-88)* . International Labour Office. Geneva, 1990.

(Note to instructor, See *International Standard Industrial Classification of All Economic Activities (ISIC, rev. 3)* .

Studies in Methods, Series M, No. 4, Rev.3. United Nations. New York, 1990.

See *International Standard Classification of Education (ISCED)* . COM/ST/ISCED. UNESCO. Paris March, 1976.

Selecting the main variables of the classification

What are the *main variables* for which the set of categories in the classification should be valid? The variable *occupation*, to which ISCO-8823 is to be applied, is defined as *the main tasks and duties of work performed*. ISIC, rev.324 applies to the variable *main productive economic activity* of a unit (establishment, enterprise or household), as indicated by the principal production process of that economic activity. ISCED25 is said to apply to the variable *content of organized*

and sustained communication designed to bring about learning.

Identifying main statistical units of the classification:

What are the *main statistical units* for which the main variable(s) can be described? By *the main statistical units* we mean the observable units which can be assigned to one unique category of the classification without reference to any other observable unit. *Jobs* are the statistical units for ISCO-88, where a *job* is defined as “a set of tasks and duties executed, or meant to be executed, by one person”.

ISIC, rev.3 classifies *economic activities of an establishment, enterprise or kind of activity unit*, where an economic activity is defined as “a process resulting in a homogenous set of products, which involves an input of resources and a production process”.

The main statistical units of the international classification of education, ISCED, are *courses* and *programs*, where a *course* is defined as a “planned series of learning experiences in a particular range of subject matter or skills offered by a sponsoring agency and undertaken by one or more students” and a *programme* is defined as “a selection of one or more courses or a combination of courses with an expressed or implied aim such as qualification for more advanced study, qualification for an occupation or a range of occupations, or solely an increase in knowledge or understanding”.

Rules for linking different statistical units to classifications:

Analysts often want to apply the same classification to different types of statistical units. (Note to instructor, See *International Statistical Classification of Diseases and Related Health Problems: Tenth revision (ICD-10)*; Volume 1; World Health Organization, Geneva 1992. A list of nine collaborating for classification of diseases can be found on pp. 7-8.

For example, one may wish to categorize persons according to the main economic activity of the establishment for which they are employed. In such cases it is necessary to have *rules for linking the statistical units being studied to the main statistical unit of the classification which one would like to apply*. In the case of classifying persons by industry, e.g. ISIC, a link has to be established between each person and a job, e.g. the ‘main job’ held during the reference period, which can then be linked to an establishment which is one of the main statistical units for ISIC. Similarly a person can be classified by ISCED only by applying for, attending, having graduated from or teaching a course.

E.3. Collecting necessary information to construct the classification:

A necessary aspect of classification development is to *collect the information which describes the defined categories* and the dividing lines between them. For an occupational classification one should in principle collect information about the main tasks of jobs for the whole range of work situations which can be found in establishments of different sizes and in different industries, e.g. what are the tasks of a “welder” in an oil pipeline company and how do the tasks compare with those of a “welder” in a ship-yard, a nuclear power station or on a highway construction site? If one wants to be able to apply different similarity criteria to define alternative aggregated sets of classification categories, then the corresponding information must be included in the descriptive definitions as well.

Those constructing a classification, to a large extent, must rely on subject matter experts and other secondary sources for most of the information needed. However, some field investigations should be undertaken for new areas and to spot-check secondary information, in particular where it can be suspected that it may be out of date. This applies in particular in areas where the information needed is collected only every five or ten years, which is often the case for the study of occupations, industry and education in most countries and internationally. The ICD26 can, however, draw upon a large number of research activities and clinical experiences within a well defined field with a long tradition of exchange of information and communication.

F. Setting the structure:

Many classifications have structures which define some groups of categories as subdivisions of others. The term *classification structure* refers to the arrangement of the content of a classification. The strategy of the structure is to arrange the content in such a way that aggregations of the most detailed categories in the set are based upon similarity criteria that are meaningful for statistical and analytic comparisons. The classification structure should make it possible to identify relevant individual categories uniquely and separately, yet still be able to present statistics for meaningful broader groupings. The preparation of explicit statements of similarity criteria used for aggregation, and explanations of the basis for drawing distinctions between groups, are important instructions needed for updating the classification and for understanding how to classify cases not explicitly dealt with when defining the scope of the different groups.

F.1. Rules for identifying same detailed categories:

Rules are required for identifying when the statistical units can be classified to the same category of a classification, and when they should be classified to different categories. For example, in ISCO-88 the rule is that *when the main tasks and duties of a set of jobs are characterized by a high degree of similarity*, then these jobs should be classified (coded) to the same detailed category. These tasks and duties define an *occupation*, which is the designation for the most detailed element in the set of categories of this classification.

For ISIC, rev. 3., it is a rule that when an *economic activity* of an establishment is characterized by a common *production process resulting in a homogeneous set of products*, then it should be classified (coded) to the same detailed class.

The most detailed categories in ISCED are those educational units which are homogeneous with respect to level and subject matter content of the communication taking place.

F.2. Similarity criteria used to define higher level categories:

Similarity criteria are required to define higher level categories (aggregated groups of categories) in hierarchical classifications. In ISCO-88 the main similarity criteria are the *skill level* and *skill specializations* needed to carry out the tasks and duties of the jobs, where *skill level* is as the main criterion to delineate the most aggregate categories, while *skill specialization* is used to delineate the more detailed categories within the aggregate categories.

The international education classification, ISCED, uses essentially the same approach by defining broad distinctions in terms of *level of instruction*, i.e. reflecting the complexity of material being communicated, while *field of study* is used to define more detailed categories.

The international economic activity classification, ISIC, Rev.3, uses (a) the inputs, the process and the technology of production; (b) the character of the goods and services produced; and (c) the uses to which the goods and services are put, as main criteria employed in the delineation of aggregate groups.

F.3. Preparing explanatory notes:

The objective of explanatory notes are to explain the boundaries of each of the categories of the classification through definitional descriptions and/or listing of what they include and exclude. Simplicity and clarity of language is imperative. Documentation of “case law” is needed to clarify where the boundaries should be drawn in practice, because neither listings nor statements of principles, can be completely unambiguous in practice.

Explanatory notes require careful editing and wording. They may be modified through updating of language, editorial corrections, and amendments prepared through a process of interpretation and rulings by the custodian. Such changes should take place as needed and be widely disseminated. The nature of changes and the reasons for introducing them require careful explanation and documentation. During the regular process of updating and amending the explanatory notes of classifications, proposals for revisions should also be collected and retained for consideration in connection with a revision process.

F.4. Preparing classification indexes:

Alphabetic indexes often make it easier to locate the placement into the classification’s categories of particular units, given their relevant characteristics. Such indexes may be comprised of text or key words from the headings and explanatory notes of a classification, as well as upon direct experience in the interpretation and use of the classification in surveys and administrative registrations.

F.5. Developing correspondence tables:

Methodological procedures have been developed for systematic comparisons between classifications, and one of the most prominent is that of correspondence tables. Correspondence tables systematically explain where, and to what extent, concepts and categories in one classification, may be found in other classifications, or in earlier versions of the same classification. This is the process of linking classifications. Correspondence tables are one of the important topics for the development and harmonization of international classifications. Some basic principles are summarized below.

Level of detail:

The level of detail upon which agreement/links shall be reached should be determined initially. The elaboration of correspondence tables should always start at the lowest hierarchical level of the classifications being linked. If possible the links should be created through the coding to both classifications of a joint alphabetical index.

Terminology:

The terminology used in the two different classifications for the same variable need to be carefully analysed to determine whether differences are real, versus purely linguistic.

Explanatory notes:

Explanatory notes should always be sufficient to allow for understanding the differences between two linked classifications, and the nature of the links established. The quality of correspondence tables depends heavily on the quality of the definitions and descriptions provided in the explanatory notes of the relevant classifications.

Structural links:

At times, opportunities for correspondences between the categories of different classifications are difficult or not possible to establish, owing to significant structural differences in the defined value sets that do not allow for common correspondences at a similar hierarchical level in the structure. In some circumstances, an approximate or truncated correspondence may be made by aggregating subclasses of one classification to different structural levels of the other classification.

In cases where an element of one classification should be linked to more than one element in the other, precise descriptions should be given of the components that were partialled out. It is not enough to label them as “ex-case” or “part of”.

Correspondence tables:

are produced through the systematic comparison of one classification (A) to another (B) to determine how a statistical unit classified to a detailed category in A should be classified to the most detailed category possible in B. It will be necessary to create two correspondence tables, one from A to B and one from B to A, unless there is a one-to-one correspondence between all detailed categories in the two classifications,

Correspondence tables should be constructed by the custodians of the involved classifications, in order to ensure that decisions reached are based on detailed knowledge of all the classifications that are being linked. Users should be consulted on the principles for resolving ambiguities and on any priority rules with inexact matches. Correspondence tables drafted by an expert should be reviewed similarly, as he/she might have an understanding and interpretation of the classifications in questions which do not correspond precisely to that of other users.

Correspondence tables between generations of the same classification or between closely related classifications should preferably be elaborated during the process of the design and elaboration of the specific classifications, and not after the design process is finished. Experience shows that the linkage exercise can contribute to the design process. The tables should be available at the same time a new or revised classification is being published, and should be part of the publications of the classifications in question. This may be done in print form and/or by EDP21 facilities (diskette, on-line). The correspondence tables should be presented in a form that is *technically correct* and *easy to understand* for users. This will normally require separate tables for the two directions.

It may not always be easy to apply all the proposed principles in practice. One reason for this is that there may be several custodians involved, each of them responsible for one or another specific classifications. Other problems might occur because of conflicts in the timing of producing and revising classifications.

G. Designing classifications databases:

Classification databases facilitate the linking of a classification to other, related or derived

classifications. They also facilitate the documentation and rapid retrieval of decisions reached in the updating and maintenance process and help to connect them to corrected versions of the classification. In order to take full advantage of the capabilities of modern database management systems, classifications may be moved from purely text-oriented documents to structures more suitable for database management. Computers and computerized classifications databases support the process of recording observations on the contents of groups, proposals for changes and decisions of rulings, and exchanging them with others in a systematic and organized manner. Correspondence with other classifications may also be more easily traced using database techniques.

Early attention by the custodians of classification to standardized structured formats for presentation of statistical classifications, increases the opportunity for presenting classifications in relational database format. For example, when numeric or alphabetic codes of the primary classification are logically structured, and when the explanatory notes are presented as separate text notes describing the categories of the classification, then it is possible to organize a classification as a database, rather than simply as a text file.

As descriptions of the categories of the classification takes on additional characteristics, e.g. correspondences with other classifications, these characteristics may also be added as additional and related variables in the database. When links have been established between classifications, e.g. between different classifications or between a structure and the corresponding definitions and descriptions, then appropriate relational data base software can be used to pull together, as required, corresponding information from the various bodies of descriptive definitions.

H. Preparation of handbooks, training, technical cooperation

Classifications require instruction and training in their use. Owing to the diverse audience of users, the logic, principles and best use of classifications must be taught and explained at different levels of detail and complexity to different client groups: statisticians, researchers, policy specialists, educators, lawyers, and the public-at-large. Technical advisory activities and training seminars are important follow-up activities to the implementation and use of statistical classifications.

Technical cooperation programmes for the development of national statistical classifications based on an ISC, will require instructional materials such as training manuals and handbooks, presenting principles and recommendations, for exchange and use in training programs for the custodians of corresponding national classifications and for other users of the ISCs. Plans for the preparation of educational and training materials should be included in the overall plan prepared for the design, implementation, maintenance and use of classifications.

I. Implementation, testing and adaptation of the classification

In the text below, references to *using the classification* means to register consistently and correctly for each unit being observed the characteristic of the variable so that the unit is placed into the most appropriate category of the classification. The analytical use of statistics based on the classification is beyond the scope of this text, even though this will be the most frequent usage of the classification.

I.1. From theory to practice: how to identify the information to be collected when using a classification

It must be determined *who will do the coding*: the respondent, an interviewer, an office

coder or an expert, and the kind of coding tools which will be available to the coder. The choice of coding strategy has significant consequences both for the degree of resolution which can be obtained when identifying a category in the classification, and for the reliability of the coding, as well as for the cost of using the classification in the context of particular data collection methods. Some classifications are designed for expert use only, e.g. the ICD which has been designed for use by medical practitioners and qualified nurses. Even for such classifications there may be elements which may be needed for use in other contexts than those originally envisaged by those designing the classification, e.g. when reporting on work-related accidents²⁷, or when a person's health status is described by a family member to a non-specialist interviewer in a health survey.

With respondent coding the respondent is presented with a set of categories from the classification and asked to indicate the one which best applies to him/her. With interviewer coding, it is the interviewer who determines the correct category, on the basis of the information received from the respondent. An office coder (and sometimes an expert coder) must determine the correct code from information written down by the respondent or the interviewer. Some classifications are designed for the situation where an expert examines the entity to be classified to get the information needed to determine the correct category, e.g. ICD.

At this point, one must address, *what question(s) to ask the respondent?* This will partly depend on the choice of coder (see above). Respondents who code themselves need to be told on what basis they should choose one of the possible response categories. These response categories need not be categories of the classification, as testing may demonstrate that more reliable information can be obtained by using several questions with response categories which need to be combined to generate the corresponding categories of the classification. Even when using categories of the classification, more reliable responses may result if the labels are chosen to correspond to every-day language rather than the technical language used in the classifications, as the technical terms' more precise meaning may not be understood correctly by a significant proportion of the respondents.

With interviewer or expert coding, the formulation of the question(s) should aim at extracting from the respondent the information which the coders need in order to identify category for this respondent. For example, for *occupation* it seems that to ask questions to determine an occupational title and main tasks and duties is the best way to determine the correct code. However, the word *occupation* should be avoided, as the term is unlikely to be understood in the intended way. "What kind of work do you do? What are your main tasks and duties?" seem to work well in many languages to capture the information needed for effective and reliable coding. For some classifications designed for expert coding the "questions" will consist of guidelines on what the expert should look for to determine the correct values, e.g. the symptoms specified for the various categories in ICD. It is significant that the custodians of ICD consider the rules for its correct use to be part of the classification itself and organize courses for medical doctors and nurses in its correct use.

Interviewers (observers) should be instructed about the *type of response elements which will be needed to ensure high quality coding*. The office coders, as well as the experts, also need to know how to select such elements from the response, whether written or oral, and how to use them for effective, accurate and consistent coding. The coding process should retain as much as possible of the information provided by the respondents or observed by the expert. For example the ILO recommends that when coding *occupation* one should code to the most detailed category which can be identified from the information provided, and that title, task and other information should be used according to clearly specified rules. These features must be incorporated into computer systems for automatic and computer assisted coding.

I.2. Developing appropriate coding tools:

Development of coding-assisting tools are needed. For many classifications the most important tools will be a coding index which should be designed to reflect the type of responses which are available to the coders, and the rules for using the index. The development of tools for automated or computer assisted coding should incorporate the rules to be used for accurate and effective coding.

I.3. Developing appropriate control procedures:

Procedures are needed to monitor the quality of the results of the coding process, and to provide feedback both to the coders and to those responsible for the classification and the coding tools.

It seems that many of the revisions to the ICD represented mainly an updating of the existing classification, see ICD-10, Vol. 2, chapter 6. The distinction between revision and updating is clearly recognized in ICD-10 which was designed to represent "a thorough rethinking of its structure and an effort to devise a stable and flexible classification, which should not require fundamental revision for many years to come. ... It has also become clear that the established ten-year interval between revisions was too short. Work on the revision process had to start before the current version of the ICD had been in use long enough to be thoroughly evaluated" (p. 151).

J. Maintenance and updating of classifications:

Maintenance of a classification means to ensure *correction of errors* made in:

(a) the construction of the classification;

(b) the explanatory notes; and

(c) the associated coding tools. Up-dating is the process of *modifying the descriptive definitions* of the categories as well as *introducing new, more detailed* categories and new coding tools. For example, updating might include adding previously unknown or genuinely new types of primary units (e.g. for ISCO-88: types of jobs; for ICIDH: types of abilities).

Maintenance and up-dating are ongoing activities of the custodian of a classification. Good feed-back mechanisms of custodians to users, and vice versa, are important elements of maintenance and updating.

J.1. Setting criteria for identifying significant effects:

What are the significant effects of maintenance and updating of classifications to *statistical comparability*? Few clear criteria have been developed which can be used to single out how modifications in classification impact on comparability of statistics independently of other factors in the data collection process. If carried out on a continuous basis, the effect of updating should be minor on most of the statistical results.

Over time, however, the accumulated effect of updating may be significant for the comparability of certain types of results, and may cancel out for others. Documentation is required on a regular basis that explains changes made in the updating process and stating the timing of the decisions reached.

J.2. Methods for correcting and/or smoothing the effects of maintenance and updating

Detailed and accessible documentation is required to correct or smooth the effects of maintenance and up-dating. Aggregation to internalize the effect of modifications will be one possibility when detailed results are not needed. Double coding for a limited data set or for a

limited period to establish conversion factors has been used in many cases, but the validity of their use depends on their stability over time and for sub-groups within the groups for which they have been calculated. The indexes for computer assisted and automatic coding systems can be constructed to provide double coding on a permanent basis.

Linked web-sites have been established between some of the custodians of international classifications, e.g. between the web-sites of the United Nations Statistics Division and the ILO Bureau of Statistics. Such links should facilitate interactive communication with users about the classifications. There is also a web-site for ISCO-88(COM) at the *Institute of Employment Research, University of Warwick*, United Kingdom, which is linked to the ILO site, and a web-site has been established by the *U.S. Bureau of Labor Statistics* for information on and comments to the draft for a new U.S. *Standard Occupational Classification*.

J.3. Consultations with users in updates, amendments and rulings

Regular coordinating mechanisms must include opportunities for users to provide information necessary for maintenance and updating of classifications through formal correspondence, meetings, and through exchange of information on the Internet. Users, for example, need opportunities to inform custodians of problems and issues related to the actual implementation in surveys and registry systems of classifications. Exceptions made by users in the application of the classifications must be communicated to the classifications' custodians. In addition, regular inclusion of users on classification committees, and their participation in committee hearings, is essential in order to keep the committees fully aware of the actual implementation problems of data collection and analysis.²⁹

Custodians of classifications systems may consider using a cyber platform on the Internet to enable more active participation of users in all the major classification debates. Addresses of custodians of classifications should be made readily available, and hyper links between them maintained.

K. Conducting revisions:

Revising an international statistical classification involves a complete review of users' needs as well as of the conceptual basis and the users' tools, i.e. all the solutions arrived at for the issues outlined above concerning the development and implementation of the classification. Such reviews should only be undertaken at long intervals, such as every 15-20 years, or if there is compelling evidence that revisions are necessary. This evidence may come from national users or from international developments. The activities involved in revising a classification are essentially the same as those needed to develop it. Only the additional methodological issues involved are discussed below.

K.1. Determining whether new solutions are better:

When is a revision necessary? How does one determine whether proposed new solutions are better than current practices? For both types of issues it would seem that they can best be settled through discussions among subject matter experts and discussions between the custodians of reference, derived and related classifications and the users of the resulting statistics.

(Note to instructor: The best way to organize such discussions will probably differ between classifications, but will involve a mix of technical expertise in the custodian's secretariat and the solicitation of external views and suggestions for a strategy which can also be used for mapping between two national classifications is presented in E. Hoffmann: "Mapping a national classification

of occupations into ISCO-88: outline of a strategy". Chapter 23 in Chernyshev, I.,ed.: *Labour Statistics for a Market Economy* . Central European University Press. Budapest, 1994.)

K.2. Implementing a revised classification in on-going statistical programs:

How does one *implement a revised classification* in on-going statistical programs, given the need for comparability with past statistics? The observations made above concerning updating and maintaining classifications also apply to the implementation of revisions. However, problems of establishing links between the revised classification and its predecessor at various levels of aggregation will be much more serious, in particular if double coding of common indexes cannot easily be carried out, i.e. if the coding index is not maintained with both old and newcodes.

In this regard, it is essential that the classifications custodian prepare training material and organize training activities for those who will be using the revised classification.

Concluding remarks:

With some classifications the resolution of some of the organizational and methodological issues outlined above will be trivial or self-evident. However, the custodian organization responsible for a classification should feel an obligation to ensure that these issues are addressed in a systematic way. In particular the custodian should provide guidance on: (I) how users of the classification may deal with those aspects which will influence the quality of the statistics using the classification; and (ii) how the quality of the statistics will be influenced by the way the problems have been resolved in particular contexts. This is necessary to obtain statistics of high (or, at least, known) quality with the resources available.

It is also clear that good international and national practices with respect to these issues will contribute significantly to ensure compatibility and comparability of the statistics using the respective classifications, nationally as well as internationally.