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A MODEL FRAMEWORK FOR EDUCATION STATISTICS

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Abstract:

The paper provides a framework for the collection and analysis of economic statistics for Education. (ISIC sector 80). It suggests an elaboration of the education products of CPC v 1 and the use of ISCED's classification of fields of education. It elaborates a set of inputs defined in terms of the CPC. It discusses the issue of the valuation of the output of Education given the fact that the Division is made up of private and public, profit and not for profit institutions.

A MODEL FRAMEWORK FOR EDUCATION STATISTICS

INTRODUCTION

Education as a Division of ISIC Rev 3 is used to classify two types of institutions: those that provide non-market services and those that provide commercial or market services.

In creating a framework for its measurement, it is necessary to define the services whose output will be measured. It is also necessary to outline the major categories of sources of revenues and costs of the institutions that would be the target statistical units of the Division.

This paper begins by outlining the products whose output should be measured. It then outlines a statistical framework, the items for which industry data should be compiled, and concludes by discussing some issues in measuring non-market services.

THE EDUCATION INDUSTRY

EDUCATION is Division 80 of ISIC Rev 3.
It is defined to be composed of the following:

<i>Industry Groups</i>	<i>Industries</i>	
801	8010	Primary Education
802	8021 8022	Secondary Education General secondary education Technical and vocational secondary education
803		Higher education
809		Adult and other education
<i>(See Appendix 1 for the definition of the industries)</i>		

Of these industry groups and industries, within the first three are to be found the formal structure of education services made available, in large part, by institutions owned and controlled by the Government. However, these services can also be provided by privately owned institutions that may or may not receive subsidies or grants from the Government.

The fourth industry group, is composed of all educational services provided to adults and others, by institutions whose curricula are outside the regular school and university system. Though Government may also subsidize institutions providing these services, it is more likely that these will be run on commercial lines. Revenues will cover costs and the owners will expect to earn profits.

Mode of delivery of educational services

Educational services can be provided in a number of ways. They can be provided in a institutional or classroom setting, where students enroll and come to classes or are supervised by teaching staff in the physical facilities of the institution. It is also possible for students to take distance courses in which all the tuition is given to students at their own place of residence. This may take place through courses provided by television or through correspondence courses conducted by mail. The lessons may be provided in printed form or in electronic form.

DEFINING THE STATISTICAL UNIT

The method of organising the delivery of educational services will differ from country to country. In Canada for example primary and secondary schools run by the Government are organised under school boards. Each school board is responsible for a number of schools. In such circumstances, the first decision that would have to be made is for which unit are data to be compiled. The school board and all the schools that it administers could be regarded to be the statistical enterprise and each school, as a separate establishment, with the central services provided by the school board being treated as a central administrative office.

In addition to providing educational services, institutions belonging to this industry may provide transportation, meals or a restaurant or cafeteria service, residential facilities, sports facilities etc.

It is assumed that in delineating the statistical unit for these industries, there will be countries using an establishment approach, in which separate establishments are created for activities for which revenues and associated costs of materials and services, labour and capital, can be distinguished. They might separate the activities for which separate establishments can be created and code them to their own industry. However, in the majority of cases, where the costs associated with these related activities cannot be separately identified, these activities will be treated as secondary activities of the units within this industry.

I. EDUCATION SERVICE OUTPUTS

The CPC defines a number of service outputs that can be regarded as the principal outputs of each of the education industries of ISIC Rev 3. They are shown below. For reasons that are explained, certain additional detail is recommended, which is shown in italics. (For definitions of the ISIC industries see Appendix 1)

ISIC 8010 PRIMARY EDUCATION

There are two service products distinguished in the CPC that constitute the principal outputs of this industry.

CPC 92110 Preschool education services and

CPC 92190 Other primary education services

921901 Other primary education services, except special needs

921902 Other primary education services, special needs

These CPC services are valid services for this industry. There are institutions that provide only preschool education services or only primary education services and institutions that provide both services. The institutions in this industry are the first stage in a system of formal education. Institutions providing preschool education are very often privately owned but those providing primary education are often financed totally by government, though they may also be privately owned. When a tuition fee is charged, it is normally for an academic year and does not vary in price by grade or option of subjects. The institutions providing the service will tend to be specialised so it will be possible to identify and value the output of the two services. The issue of how each service is to be distinguished and valued, when they are provided by the same institution will be discussed later. This ISIC industry also includes special school-type education for handicapped children at this level. Given the analytical interest in distinguishing these services, it is suggested that this further breakdown be adopted in the CPC. Institutions that will provide primary educational services for students with special needs are likely to be specialised, or able to distinguish either the fees received, the enrollment in each or the cost of producing the service.

ISIC 8020 SECONDARY EDUCATION

In the case of the following two ISIC industry groups, there are presently two CPC's, each of which describes the principal output of one of the two industries. As each of the industries also includes special school type education for handicapped students at this level, for the reasons explained above, it is recommended that the CPC's be further subdivided.

ISIC 8021 GENERAL SECONDARY EDUCATION

CPC 92210 General secondary education services

922101 General secondary education services, except special needs

922102 General secondary education services, special needs

ISIC 8022 TECHNICAL AND VOCATIONAL SECONDARY EDUCATION

CPC 92230 Technical and vocational secondary education services

922301 Technical and vocational secondary education services, except special needs

922302 Technical and vocational secondary education services, special needs

These CPC's are valid services for the related industry. In each there are institutions that specialize in producing this service. These institutions are the second stage in a system of formal education often financed totally by government but there also exist private institutions providing the same service. When a tuition fee is charged, it is normally for an academic year and does not vary in price by grade or option of subjects. There may be institutions that provide both general secondary education and technical and vocational secondary education, for which both CPC's would apply.

ISIC 8030 HIGHER EDUCATION

This class includes post-secondary sub-degree level education and education that leads to a university degree or equivalent. A great variety of subject-matter programmes are offered at this level, some laying more emphasis on theoretical instruction and some on practical instruction.

When the CPC's were defined they were related to categories of ISCED. It is recommended that under the one CPC for University and other higher education services, which corresponded to ISCED levels 6&7, two separate CPC's be created corresponding to each level. In addition, it is recommended that the classification for Fields of Education developed by ISCED be used to further subdivide the CPC. It is further suggested that the Fields of Training classification developed by Eurostat can be used to even further subdivide the CPC's for national use.(only the Broad fields of the ISCED Fields of education are shown below. See appendix II for the details of the ISCED Fields of education classification and the Eurostat extension to Fields of Training.)

CPC 92310 Post- secondary technical and vocational secondary education services (ISCED level 4 &5)

92310x General Programmes

92310x Education

92310x Humanities and Arts

92310x Social Sciences, business, law

92310x Science

92310x Engineering, Manufacturing, and construction

92310x Agriculture

92310x Health and welfare

92310x Services

CPC 92390 University and other higher education services (ISCED level 6&7)

923901 University undergraduate education services (ISCED level 6)

923901x General Programmes

923901x Education

923901x Humanities and Arts

923901x Social Sciences, business, law

923901x Science

923901x Engineering, Manufacturing, and construction

923901x Agriculture

923901x Health and welfare

923901x Services

923902 University graduate education services (ISCED level 7)

923902x General Programmes

923902x Education

923902x Humanities and Arts
923902x Social Sciences, business, law
923902x Science
923902x Engineering, Manufacturing, and construction
923902x Agriculture
923902x Health and welfare
923902x Services

ISIC 8090 ADULT AND OTHER EDUCATION

Institutions in this ISIC are characterised by their specialisation and their tendency to be relatively small. It should be possible to use the fields of training classification developed by Eurostat (see Appendix II) as the products of the institutions in this industry. Because of the extent of specialisation, many of the institutions belonging to the industry can be treated as producing one product or type of educational service, belonging to one or another of the ISCED fields of education and one or another of the 25 fields of training. Any field not named, can be treated as falling into the residual class.

CPC 92900 Other education and training services

As illustration some important types of training are listed below and related to a particular field of education category.(see appendix II)

929001 Literacy and numeracy training services (ISCED 08)
929002 Personal development training services (ISCED class 09)
929003 Arts Training services (ISCED class 21)
929004 Language Training services (ISCED class 22)
929005 Business and administration training services (ISCED class 34)
929006 Computer Training services (ISCED class 48)
929007 Personal services training (ISCED class 81)
929008 Transport training services (ISCED class 84)
929009 Other education and training services nec

ALTERNATIVELY

To be comparable with the categories of the CPC used in the other categories of educational services, the entire list of Broad levels of Education can be used as first level subdivisions of CPC 92900 , followed by the further breakdown of fields of education and of training as hierarchical subdivisions. The output of each type of training school , assuming that its curriculum is homogeneous and can be treated as one product, can then be classified in the appropriate category.

II. THE STATISTICAL FRAMEWORK

A framework for the collection or compilation of statistics about both private and public educational institutions is outlined below.¹ The framework is structured in the form of a number of modules.

Revenues

Private educational institutions will earn revenues from tuition fees that might include the use of certain facilities such as laboratories and sports facilities. It is assumed that the fees for residential accommodation for students, meals and transport, such as bus service provided by the institution can be reported separately.

In addition private institutions will earn other operating revenues such as revenues from rental and leasing and other sources.

Though distance learning may be a relatively insignificant source of revenues it is important to recognise its existence particularly for international trade in statistics data.

When compiling data for public educational institutions run by the Government, most parts of this module will be irrelevant. However, even Government institutions may charge fees for certain services such as accommodation and transportation and they may earn revenues from other sources.

Product Outputs

To collect data for the different educational services provided by each industry, it will be necessary to collect data on the tuition fees paid, for each of the CPC products described above, as the main outputs of the industry. A good indicator of the different services provided will be enrollment and it is recommended that enrollment data are collected.

Operating Subsidies and Grants

Many private institutions will receive subsidies and grants, which according to the conventions of the National accounts will have to be deducted from Total Operating Expenses

Expenses

This module relates to operating expenses. In this module Employee remuneration is divided into Wages and Salaries, Supplementary Labour Income and Severance pay.

¹ The framework presented here draws upon work under way in Statistics Canada in the context of PIPES (Program for the Improvement of Economic Statistics).

General Expenses are detailed into a number of categories of expenses on purchased goods and services. These would be similar to those for any other industry, but the ones listed are likely to be important for the education industries. Service expenses are listed in great detail but at two levels of detail for those who may not be able to collect the greater detail or do not wish to compile data at the most detailed level.

Next there is a module for Royalties, Franchise fees and Property and Business Taxes and one for Depreciation.

Capital Expenditure and Employment

Finally there are modules for Capital Expenditure and Employment.

1. **REVENUES**

1.1 **OPERATING REVENUES**

Tuition and other Student fees <i>(including other compulsory administrative fees, athletic fees, lab fees associated with curricular activities)</i>	
Other tuition fees <i>(including correspondence courses and distance learning)</i>	
Residence or other accomodation fees <i>(including revenues for food services, laundry or other services associated with the provision of accommodation.)</i>	
Other fees for specific activities <i>(including transportation, etc.)</i>	
Operating Revenues from other sources	
Rental of campus residential facilities <i>(revenue from the rental of residential facilities to individuals or businesses other than the student body for conferences etc and during the vacations)</i>	
Rental and Lease of other facilities and equipment <i>(revenue from rental and leasing of space and other facilities except residential facilities to individuals or businesses outside the student body)</i>	
Rental and Lease of other facilities and equipment <i>(revenue from rental and leasing of space and other facilities except residential facilities to individuals or businesses outside the student body)</i>	
Revenue from the sales of goods purchased for resale <i>(books, stationary and other supplies)</i>	
Revenue from sales of other goods and services <i>(e.g. parking, publications, etc.)</i>	
Miscellaneous operating revenue <i>(revenue from concessionaires (e.g. vending machines)</i>	
Royalties <i>(revenue derived from granting the rights or usage of patents, copyrights and other intellectual property owned by the institution.)</i>	

1.2 **NON OPERATING REVENUES**

Investment Income <i>(Including interest, dividends and other investment income)</i>	
Other non-operating revenues	

2. OPERATING SUBSIDIES (including grants)

2.1 GOVERNMENT

Central (national)
Regional (provincial, state)
Local (municipal, district)

2.2 NON-GOVERNMENT

(private, individual and business, non-profit organisations, households, bequests, sponsorships etc.)

3. OPERATING EXPENSES

3.1 EMPLOYEE REMUNERATION

3.1.1 Wages and Salaries of Employees

Teachers/Professors	(ISCO 88: 231, 232, 233, 234, 331, 332, 333, 334)
Management, administrative and other professional and pedagogical personnel	
All other support personnel (including bus drivers)	
<i>Include vacation pay, bonuses, taxable allowances and benefits (including Room and Board) retroactive wage and salary payments)</i>	

3.1.2 Supplementary Labour Income

(employer portion of payments for employee benefits such as employment insurance premiums, medical, dental, drug and vision care plans, pension, annuity or retirement plans or lump sum payments to employees at time of termination, contributions to provincial health and education payroll taxes, other employee benefits such as childcare, tuition etc)

3.1.3 Severance Payments to Employees

(severance pay or lump sum payments paid to employees at time of termination or retirement.)

3.2 GENERAL EXPENSES

3.2.1 Cost of Materials and Supplies

(include costs of transportation; exclude purchases of goods for resale in the same condition)

Pu	Publications <i>(textbooks, books, CD ROMS, etc.)</i>	
	School, University and Office Supplies	
	Software and Software upgrades <i>(do not include capitalised costs)</i>	
	Shop, laboratory and clinic supplies	
	Cafeteria supplies and food <i>(direct purchases)</i>	
	All other materials, equipment and supplies	

3.2.2 Goods Purchased for Resale

Pu	Purchases of goods for resale <i>(e.g. textbooks, other books, stationary and other supplies)</i>	
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3.2.3 Utilities

	Energy <i>(e.g. Electricity, fuel oil, natural gas, gasoline, diesel oil, propane, motor oil)</i>	
	Water	

3.2.4 Purchased services

CPC v.1

Transportation (<i>include payments for bus services for students</i>)	6421
Postage and courier	681
Telephone and other telecommunications (<i>include telephone, fax, cellular phone or paper services for transmission of voice, data or image</i>)	841
Cable and Satellite, radio and television, fees	841
Information retrieval and supply (<i>include internet access charges, library fees, records management</i>)	842, 843, 845
Rental and leasing expenses Rental of land and buildings Rental of motor vehicles (<i>exclude rental and leasing of vehicles with driver, to be included under transportation</i>) Rental of computers and peripherals Rental of other machinery and equipment (<i>exclude rental of machinery and equipment with operator</i>) Rental of other goods	
	7211
	7311
	73124
	73123, 73125, 73129
	7321, 7322
Purchased Maintenance and Repair Purchased maintenance and repair of buildings and structures (<i>include materials and labour, exclude property management fees</i>) Purchased janitorial and cleaning services (e.g. sweeping and snow removal services) (<i>include materials and labour, exclude property management fees</i>) Purchased maintenance and repair of motor vehicles, machinery and equipment and other goods services (<i>include parts and labour</i>)	
•	54129, 54210, 54220, 54251, 54252, 54270
•	54790, 853, 94310
•	871, 872

Real Estate services <i>(e.g property management fees, real estate commissions, etc)</i>	72222, 72212, 72230
Sewage, refuse, sanitation and other environmental protection services.	94
Professional and business service fees	
Legal fees	821
Accounting and auditing fees	822
Consultancy fees	
- Information technology consulting fees	8314
Other Consultancy fees (management, technical and scientific)	8311, 8313

Other professional and business service fees Fees for health services <i>(e.g. fees paid for doctor's services)</i> Education and Training fees <i>(e.g. professional development)</i> Printing fees Data Processing fees Payroll preparation fees All other professional and business services fees <i>(including coordination fees for seminars and conferences, research and development, etc.)</i>	931
	922, 923, 929
	86921
	8596
	8599 81, 8312, 8315, 8316, 8319, 823, 824, 834, 835, 837, 838, 839, 852, 854, 859, 921, 932
Financial services fees <i>(e.g. Bank service charges, exclude interest expenses)</i>	711, 712, 715
Insurance premiums	713
Advertising and sales promotion	836
Business Travel, Meals and Entertainment, <i>(include payments to staff for transportation, accommodation and meals related to travel and hospitality. Where possible each of these expenses should be reported separately.)</i> - Transportation: - Meals: - Accommodation:	641, 642, 651, 652, 661, 664, 678 632, 633 631
Student travel and related services <i>(costs of transportation, accommodation and meals related to field trips, special events etc as part of regular curriculum. Where possible each of these expenses should be reported separately.)</i> - Transportation:	641, 642, 651, 652, 661, 664, 678

- Meals:	632, 633
- Accommodation:	631
Purchased cafeteria and other food services	63230
Payments to employment agency or personnel suppliers <i>(payment for personnel supplied and/or commissions or fees for placement of personnel).</i>	851
Association memberships	9512
All other purchased services	

3.2.5 Other Expenses

CPC v.1

Royalties	5129
Franchise fees	5219
Property and business taxes	

3.2.6 Depreciation

Depreciation and amortisation of own assets

3.2.7 All other Operating Expenses

4. CAPITAL AND REPAIR EXPENDITURES

Land and buildings	
Furniture and equipment	
Other (<i>including library acquisitions of 'collections'*</i>)	

* works of art, historical treasures and other similar assets for public display and educational use.

5. EMPLOYMENT

Number of persons employed by occupation	
Teachers/Professors	(ISCO 88: 231,232,233,234,331,332,333,334)
Management and other professional and pedagogical personnel	
All other administrative and support personnel (including bus drivers)	

III. MEASURING THE OUTPUT OF EDUCATIONAL SERVICES

To measure the output of educational services it will be necessary to measure the output of each of the CPC services, described above, in terms of tuition fees for private institutions and enrollment. Tuition fees paid on behalf of students by the educational institution would also have to be taken into account.

MARKET AND NON-MARKET EDUCATIONAL SERVICES

As each ISIC Rev. 3 industry will be composed of private and public institutions, the data for each industry would have to be grouped under public and private. This would probably be straightforward as the source of information relating to Government institutions would be Government accounts. Private institutions will be able to report tuition fees and subsidies whereas Government institutions will probably report costs and perhaps some minimal miscellaneous revenues.

VALUING THE OUTPUT OF PRIVATE INSTITUTIONS

Private institutions may be totally privately financed by tuition fees and income from endowments, gifts, investment income etc. or they may be totally or partially subsidised by government. To the extent that their income contributes to the tuition fees of students, that should be added to the actual tuition fees received. Subsidies will be measured as a primary input before profits are calculated.

VALUING THE OUTPUT OF NON-MARKET EDUCATIONAL SERVICES

One approach to the valuation of the non-market educational services provided by Government is to treat them as the sum of costs including depreciation.

Another approach is to attempt to arrive at a market price. In almost all the industries that have been defined there will be private institutions providing a service that will warrant their classification to the industry. In principle, it will be possible, in the first instance to separate and group statistics relating to public institutions providing non-market services from those relating to private institutions providing market services. Then it will be possible to calculate tuition fees and the number of students enrolled to arrive at a tuition fee per student and apply it to the number of students enrolled in the public institutions. This however, may be very misleading, as the private schools may be elitist schools with a much higher teacher student ratio and one which provides greater facilities in terms of space, buildings, sports facilities and equipment per student as compared to the public institutions within the same industry. In that case, it will be necessary to make some allowance for these factors before arriving at the market price to be applied to the number of students enrolled in the public institutions belonging to the industry. Another possibility would be to calculate an average rate of profit of private institutions and apply it to the costs of the public institutions to arrive at a market value of educational services provided by public institutions.

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APPENDIX I

ISIC DIVISION 80: EDUCATION

ISIC 8010 Primary education

This class includes general school education at the primary level. Pre-primary school education which is included here is usually given in nursery schools, kindergartens or special sections attached to primary schools. The programmes focus on group activities and are designed primarily to introduce very young children to anticipated school-type environment.

Primary school education includes general school education at the first level. Programmes are designed to give the students a sound basic education in reading, writing and arithmetic along with an understanding of other subjects. Specialization in instruction at this level is generally low. Literacy programmes provided for children who have no opportunity to attend school are included. Also included is special school-type education for handicapped children at this level.

ISIC 8021 General secondary education

This class includes general school education at the secondary level. Subject specialization at this level often begins to have some influence even on the educational experience of those pursuing a general programme. Such programmes are designated to qualify students either for technical and vocational education or for university entrance without any special subject prerequisite. Also included is special school-type education for handicapped students at this level.

ISIC 8022 Technical and vocational secondary education

This class includes all technical and vocational education below the level of university. Typically, the programmes emphasize a subject-matter specialization and instruction of both theoretical background and practical skills generally associated with present or prospective employment. The aim of a programme can vary from preparation for a general field of employment to a very specific job. Also included is technical and vocational school-type education for handicapped students at this level.

ISIC 8030 Higher education

This class includes post-secondary sub-degree level education and education that leads to university degree or equivalent. A great variety of subject-matter programmes are offered at this level, some more emphasizing theoretical instruction and some more practical instruction.

ISIC 8090 Adult and other education

This class includes adult education, i.e. education for people who are not in the regular school and university system. Instruction may be given in day or evening classes in schools or in special institutions providing for adults. Also included is all instruction through radio and television broadcasts, or by correspondence. Instruction may cover both general and vocational subjects. Typically, most of these educational activities presuppose that the student volunteered to attend as he/she has a particular motivation in taking the programme. Provision of literacy programmes for adults is included. Also included are education at first and second levels in specific subject matters, not elsewhere classified, and all education which is not definable by level.

APPENDIX II

ISCED FIELD OF EDUCATION

Classification of Fields of Training

Broad fields	Fields of education	Fields of training
0 General Programmes	01 Basic programmes 08 Literacy and numeracy 09 Personal development	010 Basic programmes 080 Literacy and numeracy 090 Personal development
1 Education	14 Teacher training and education science	141 Teacher training 142 Education science
2 Humanities and Arts	21 Arts 22 Humanities	211 Fine arts 212 Performing arts 213 Graphic and audio-visual skills 214 Design 215 Craft skills 221 Religion and theology 222 Foreign languages and cultures 223 Native languages 224 Other humanities
3 Social sciences, Business and Law	31 Social and behavioural science 32 Journalism and information 34 Business and administration 38 Law	310 Social and behavioural science 321 Journalism 322 Library, documentation, archive 341 Wholesale and retail sales 342 Marketing 343 Finance, banking, insurance 344 Accounting 345 Management 346 Secretarial and office work 380 Law
4 Science	42 Life sciences 44 Physical sciences 46 Mathematics and statistics 48 Computing	420 Life sciences 440 Physical sciences 460 Mathematics and statistics 481 Computer science 483 Computer applications

5 Engineering, Manufacturing and Construction	52 Engineering and engineering trades 54 Manufacturing and processing 58 Architecture and building	521 Mechanics 522 Electricity and energy 523 Electronics 525 Chemical and process 526 Motor vehicles 541 Food processing 542 Textiles, clothes, footwear, leather 543 Materials (wood, paper, plastic, glass) 581 Architecture and town planning 582 Building
6 Agriculture	62 Agriculture, forestry and fishery 64 Veterinary	621 Crop and livestock production 622 Horticulture 623 Forestry 624 Fisheries 640 Veterinary
7 Health and Welfare	72 Health 76 Social services	721 Medicine 722 Medical services 723 Laboratory technology 724 Nursing 725 Dental studies 761 Child care 762 Social work
8 Services	81 Personal services 84 Transport services 85 Environmental protection 86 Security services	811 Hotel, restaurant and catering 812 Travel, tourism and leisure 813 Sports 814 Homeservices, hairdressing and other personal services 840 Transport services 850 Environmental protection 861 Protection of property and persons 862 Occupational health and safety 863 Military
9 Not known/unspecified	99 Not known or unspecified	999 Not known or unspecified

(*) NB. The Fields of Training in column three of this table was developed for and has been adopted by Eurostat, particularly for the collection of data on vocational training and adult education. It is presently under review and may be revised when it is published later in 1998 by Cedefop/Eurostat, Fields of Training-Classification and Manual. Developed by R Andersson and A-K Olsson of Statistics Sweden