

# Measuring working time: an alternative approach to clasifying time use

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## Introduction and background

1. Most regular statistics of working time and working time arrangements are based on information collected through Labour Force Surveys, see e.g. *ILO (1990b)* or through Establishment Surveys, see e.g. *ILO (1995)*. However, it has for a long time been argued that to be reliable and valid the measurement of actual time worked has to be integrated into a framework which accounts for all time use activities, see e.g. *Watts & Skidmore (1978)*, *Hoffmann (1981)*, *Niemi (1983)*, *Mehran (1988)* and *Mata (1993)*. By doing so one might be able to not only (i) improve the precision and reduce biases in the measurement of total time worked, but also (ii) obtain estimates of the scheduling of work activities, and (iii) obtain estimates for the way time is used at work, which are the time use issues of interest to users of statistics on working time. In particular, improved information on how women and men are actually spending their time when at work may provide a basis for better understanding segregation between men and women within similar occupations and why women have less chances of being promoted to supervisory positions.

2. The most developed frameworks for the analysis of time use are those incorporated into the *Classifications of Time Use Activities (CTUA)* used by *Time Use Surveys (TUS)*, see e.g. *Eurostat (1996a)*. However, conventional time use surveys treat the time spent at paid work as a “black box”. While respondents are required to report on other activities carried out during a set of days with great detail, they are not required to distinguish between the different activities carried out at their place of work. Only when they work at or near their home are respondents required to distinguish between different activities. Estimated time worked therefore (a) relies on the respondent’s assessment of what “work” is and (b) assumes that time spent at work is time actually worked. It is evident that these assumptions do not hold. As a result, estimates of actual time worked of paid employees, most of whom work outside the home and do not report on the specific activities while at work, are not significantly different when obtained through time use surveys from what they are in household-based labour force surveys (LFS). However, the two types of sources give different estimates of time worked by self-employed workers, see e.g. *Niemi (1982)*, basically because the self employed working close to home in the TUS are requested to distinguish between their different activities while in the LFS they report *en bloc* on “time worked”, with only limited filtering out of time which is not work related.

3. It follows that in order to achieve (i) to (iii) above, the “black box” of employment needs to be opened, to specify what it is that is done during that one fourth to one third of the time used by a majority of the adult population. However, looking at how the categories in CTUAs are conventionally defined, it is clear that to classify a “time interval” (or “slot” in the terminology of

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Harvey (1990)) in a conventional CTUA one needs information both about the “type of activity” and about the “context” of the activity, see e.g. *Eurostat (1996b)*. The “type of activity” describes **what** the respondent did. The 'context' is multi-dimensional, consisting of e.g. 'where', 'for what purpose (or 'for whom') and 'with whom' the activity has been undertaken. Although generally used as the main criteria for clustering activities into categories, the “context” variables are not applied in a consistent way at the different levels of the classification. The result is that the categories defined represent a heterogeneous mix of 'type of activity' and a large number of different variables, as illustrated in the table below. As a result, the distinction between 'employment' and other activities is based entirely on consideration of context, i.e. whether the activities are undertaken “for pay, profit or family gain”, and sub-division of the 'employment' category is also mainly in terms of context, e.g. whether the activity is the “main” job or a “secondary” one.

4. The use of different similarity criteria in different parts of the classification, have resulted in a confusion about where activities of the same type are to be classified. We may find, for example, that "learning" is classified differently when it takes place at work than when in the context of school or free time; the same is true of "eating" or "having coffee" when at work, socializing or otherwise; of "caring" for family members or for non-family members through an organization; of "baking", "repairing", etc. for own household or for other households; of "talking on the phone" if connected to child care, if socializing or if done at work. Thus the use of 'context' to define aggregate categories in a CTUA will result in internal duplications, because the same type of activities are carried out in different contexts. It will also lead to incomplete observation of those activities which are not separately identified in all contexts, e.g. activities done at work as well as outside work. Depending on the variables used to define 'context' there is also a danger of external duplication, because distinctions are made within the classification which relate to variables for which other classifications exist, e.g. the activity “eating in restaurants” duplicates the context variable “location”. These features can be observed in the CTUAs presented in e.g. *Eurostat (1996a)* and *UNSD (1997a and 1997b)*, see the table below.

5. Trying to open the “black box” of employment will add significantly to both internal and external duplications, because many of the things we do when working for 'pay, profit or family gain' are of the same type as the activities carried out in other contexts: e.g. producing goods, travelling, reading, writing and talking (face-to-face and on the telephone), waiting and eating. Sleeping, preparing food, caring for children and cleaning house will also be work activities in some jobs.

### Criteria used to make distinctions at the different levels of a conventional CTUA

	Between 1-digit groups	Between 2-digit groups	Between 3-digit groups
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work activities	“purpose of the activity” (i.e. whether for “pay, profit or family gain” or not)	organization of working time (whether it is overtime or not); location of activity (eg., at home or not); main/secondary job; status in employment (e.g. paid work, home based work, self-employment work and unpaid work); whether domestic work or other work	“type of activity”
housework activities	“	“type of activity”; one group of children’s activities	“type of activity”
child and family care	“	“for whom”	“type of activity”.
shopping activities	“type of activity”	type of goods or service purchased; “type of activity”	type of goods or service purchased
community work	“purpose of the activity”	“type of activity”	“type of activity”
education activities	“type of activity”	formal/informal studies; one group for children’s learning activities	when studies are formal, “type of activity”; for other type of studies, “type of course” followed; no clear criteria to distinguish within children’s minor group.
socializing and hobbies	“	“type of activity”	for some minor groups, “with whom” or “where”; for other minor groups, “type of activity”
personal care	“	“type of activity”	“type of activity” and “where”
travelling activities	“	“purpose of the activity”	“type of activity”. No specification is made as to whether the person is driving or being driven.

Note: Based on Eurostat (1996a) and UNSD (1997a and b).

6. The objective of this article is to present an approach to the construction of a set of typologies for time use which will ensure that all “time slots” are coded to both the ‘type of activity’ undertaken and to variables which will describe the ‘context’ of the activity of that slot. The use of this approach will ensure that the CTUA will have only one category for each “type of activity”, thus simplifying the coding of “what” it is that the respondent does during that time period. It will also make explicit the type of additional information which is needed to ensure that each time interval can be assigned to the type of descriptive and analytical category needed by the users, e.g. that the “travel” slots can be grouped together for the analysis of total travel time and travel patterns, but allocated to the different purposes for which one travels when the total time devoted to them is to be the focus of analysis.

### Methodological considerations

7. All classifications used when collecting and presenting statistics represent discrete value sets for one or more of the variables (to be) measured in statistical data collections, or for which

statistics are to be presented. Some of these value sets can be very simple, such as the set [*male, female*] used for the variable 'sex', while others can be quite complex with a large number of categorical values. The latter classifications are often multidimensional and hierarchical, as exemplified by the *International Standard Classification of Occupations (ISCO-88)* and the *International Standard Industrial Classification of All Economic Activities (ISIC, rev.3)* as well as by the CTUAs used in national time use surveys.

8. While the presentation and analysis of statistics may require the use of multi-dimensional variables with corresponding value sets, both data capture and explanations of how measurements are made will normally be facilitated by the use of one dimensional variables and value sets, which can be combined to create the multi-dimensional variables needed for description and analysis of results.

9. An in-depth discussion is needed of the criteria to be used to decide when one 'activity', to be defined at the most detailed level in a CTUA, differs from another, and of the main similarity criteria to be used for creating more aggregate groups in such classification schemes: i.e. should 'reading' for entertainment, information and learning be regarded as the same or as different 'activities', and should they all be included in one more aggregate group "reading", or in three different aggregate groups "entertainment", "information" and "learning"? One way to accommodate more than one 'answer' to these questions is to regard the "type of activity" variable as an **action**, and the purpose, location, etc. of the activity as the "context" variable, i.e. 'reading' is the operational 'type of activity' characteristic, and 'entertainment', 'information' and 'learning' are characteristics of the context variable 'purpose'.

10. The economic activities to be classified by any CTUA must be activities which are undertaken by persons, and to describe their type is to describe directly **what the persons do**. Despite the slightly confusing terminology which will result it seems useful to accept the conventions that (i) "whatever an individual spends time on is considered an activity in the time use context" and that (ii) "productive activities are those whose performance can be delegated to another person with the same desired result", see *UNSD (1997a)*, and that the latter activities can be designated as "work"<sup>2</sup>. From (i) and (ii) it follows that "economic activities", defined as 'those activities which are considered as inside the production boundary defined for the *System of National Accounts (SNA-93)*, see *Inter-Secretariat Working Group on National Accounts (1993)*, is a sub-set of all productive activities and that 'market activities', defined as "those activities which are carried out for pay in cash or kind or for (the expectation of) profit", will be a sub-set of all economic activities. These sub-sets of the productive activities can only be distinguished by considering the 'context' in which they are performed. They cannot be defined only on the basis of **what** it is that is being done, i.e. the actions as such.

11. Some aspects of the activities which from their context can be defined as 'economic' or 'paid work', are better described, i.e. classified, with reference to the 'job' which all employed persons hold, by definition. A "job" is defined as "a set of tasks and duties executed, or meant to be executed, by one person" whether in paid employment or self-employment, see *ILO (1990a)*. All work related time intervals thus can be related to a job, and a number of variables which are central

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<sup>2</sup> Note, however, that we will follow standard ILO terminology and use "workers" as the designation for all persons who engage in 'economic' activities, i.e. who can be classified as either 'employed' or 'unemployed', see e.g. *Husmanns et al (1990)*.

for the description of work activities are characteristics of jobs, such as the contractual situation which is described directly by the 'status in employment' variable, see *ILO (1993)*. In addition, jobs can be classified by the activity or function of their place of work, i.e. by 'industry', see *United Nations (1990)*. These variables have value sets which are consistent with categories used in SNA-93 for the corresponding variables defined there. 'Jobs' can also be described by the variable 'occupation', which classifies jobs according to their 'main tasks and duties', see *ILO (1990)*.

### **Illustration of an alternative set of time use relevant classifications**

12. In Annexes I and II we present an illustration of the approach to typologies for time use activities advocated in this article, in the form of an *Alternative Classification of Time Use Activities (ACTUA)* (Annex I) and a list of the most important context variables incorporated into the trial ICTUA presented in *UNSD (1997a)*. It is the task specifications of a classification of 'occupations' which are most likely to provide a list of the type of work-specific activities which are performed in a job. Therefore the terminology of the *International Standard Classification of Occupations (ISCO-88)* has been used as the main source for the tentative list of work specific activities in the ACTUA. It may be convenient to incorporate into a classification such as this ACTUA some context variables which are both important and very specific to one or a few types of time use activities. Thus the CTUA and the list of relevant, separate context variables should be developed together when using the approach advocated in this note. Internationally agreed value sets should be developed also for them, to serve as models for corresponding national value sets and to facilitate international comparisons of national TUS results. Other variables will be needed as well, e.g. to describe further the type of jobs and the training activities undertaken. Some of them already have internationally agreed value sets, e.g. 'occupation' (ISCO-88), 'industry' (ISIC, rev.3), 'status in employment' (ICSE-93), 'institutional sector of employment (in SNA-93)' and 'educational activity' (ISCED).

### **Concluding remarks**

13. It is clear that the approach to the classification of time use activities advocated in this article will represent a break with the CTUAs which have been used, successfully, by the TUS carried out in many countries since the pioneering work of *Szalai (1972)*. However, we do not see this as an important argument against the approach proposed by us, for these reasons:

- (i) The trial ICTUA presented in *UNSD (1997b)* introduces a necessary and long overdue extension of the traditional CTUAs to specify specific work related activities. This in itself represents a significant break with the traditional CTUAs, and it brings out some of the inherent weaknesses of the approach used in the past, such as the duplications. These weaknesses have been recognized earlier, but not seen as important. However, they are likely to become very important with the extension to work related activities and the specification of a 3 digit level in the trial ICTUA.
- (ii) Comparability with the results of earlier surveys is an important objective which will not be jeopardized by the adoption of the approach to the classification of time use activities proposed in this note. What is important for comparability over time of survey results is not that the structure of the past classification be maintained, but that users of new classifications

are able to reconstruct the old classification by combining and reorganizing component parts of the new instruments. In that way tables can be constructed which are consistent with tables made from previous surveys. With the approach we advocate in this article this will in fact be easier, not more difficult.

14. We would like to conclude by again underlining that the ACTUA in Annex I has been prepared to illustrate one possible manifestation of the general methodological approach to CTUAs advocated here. Only empirical testing can determine whether or not this approach can be used successfully in actual TUSs, and whether it will have the advantages which we claim for it. Even if successful such testing will probably lead to significant modifications of the illustrative ACTUA presented in Annex I, but its main features are likely to remain in place.

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# **ANNEX I : AN ALTERNATIVE CLASSIFICATION OF TIME USE ACTIVITIES**

## **1. PRIMARY PRODUCTION ACTIVITIES**

**11 planting, harvesting, picking, weeding**

**111 PREPARING LAND, SOWING, PLANTING, AND CULTIVATING CROPS**

**112 HARVESTING AND STORING CROPS**

**12 tending animals**

**13 hunting, fishing, forestry**

**131 HUNTING**

**132 FORESTRY**

**133 GATHERING**

**134 FISHING**

**14 digging, cutting**

**15 gardening**

**16 Collecting water**

## **2 CRAFT-RELATED ACTIVITIES**

**21 laying bricks, cutting glass, plumbing, painting, engraving, carpenting, printing, packing, maintaining and repairing Buildings**

**211 CONSTRUCTING BUILDINGS**

**212 OTHER CONSTRUCTION**

**213 MAINTAINING AND REPAIRING BUILDINGS, ETC**

**214 PACKING, CARRYING AND LOADING**

**22 fitting, installing, tool setting, maintaining and repairing tools and machinery**

**221 MOULDING, WELDING, TOOL-MAKING**

**222 INSTALLING MACHINES, ELECTRICAL AND ELECTRONICAL EQUIPMENT**

**223 MAINTAINING AND REPAIRING MACHINES, ELECTRICAL AND ELECTRONICAL EQUIPMENT**

**23 making handicrafts, precision instruments, Pottery, printing**

**24 food processing activities: butchering, baking, confectionery making, preserving, curing**

**241 BUTCHERING, FISHMONGERING, ETC.**

- 242 BAKING, CONFECTIONERY MAKING**
- 243 MAKING DAIRY PRODUCTS**
- 244 PRESERVING FRUITS AND VEGETABLES**
- 245 TOBACCO PREPARING AND CURING**
- 246 PROCESSING GRAINS**
- 247 PROCESSING BEVERAGES**

**25 textile and related trades activities: weaving, knitting, sewing, , shoemaking, tanning**

- 251 WEAVING, KNITTING**
- 252 SEWING**
- 253 TREATING WOOD AND MAKING CABINETS**
- 254 SHOEMAKING, LEATHER WORK**

**3. OPERATING PLANTS AND MACHINES AND ASSEMBLING ACTIVITIES**

**31 operating/conducting fixed machines and assembling**

- 311 OPERATING STATIONARY PLANTS**
- 312 OPERATING MACHINES**
- 313 ASSEMBLING MACHINES, EQUIPMENT AND OTHER PRODUCTS**

**32 driving vehicles and mobile plants**

- 321 DRIVING LOCOMOTIVE-ENGINE AND RELATED MACHINES (TRAINS, TRAMS, ETC.)**
- 322 DRIVING MOTOR-VEHICLE MACHINES (PRIVATE CARS, TAXI, BUSES, TRUCKS, ETC.)**
- 323 DRIVING AGRICULTURAL AND OTHER MOBILE-PLANTS VEHICLES**
- 324 DRIVING SHIPS AND BOATS, BARGES, ETC.**
- 325 PILOTING AIRCRAFT**
- 326 DRIVING HAND AND PEDAL VEHICLES**

**4. CLEANING, SWEEPING, ORDERING**

**41 cleaning**

- 411 CLEANING DWELLING**
- 412 CLEANING APPLIANCES AND MACHINERY**
- 413 CLEANING SURROUNDINGS OF DWELLING**
- 414 CLEANING/WASHING DISHES**
- 415 CLEANING/WASHING CLOTHES**
- 416 CLEANING OTHER**

**42 Ironing**

**43 ordering, sorting**

- 431 ORDERING, SORTING PAPERS**
- 432 ORDERING, SORTING GROCERIES**

**433 ORDERING, SORTING GARBAGE**

**434 ORDERING, SORTING CLOTHES**

**435 ORDERING DWELLING, ROOMS**

## **5. TRADING ACTIVITIES**

### **51 buying**

- 511 BUYING INPUTS OF PRODUCTION, SUPPLIES**
- 512 BUYING FOOD AND HOUSEHOLD SUPPLIES**
- 513 BUYING HOUSEHOLD APPLIANCES, ARTICLES AND EQUIPMENT**
- 514 BUYING CAPITAL GOODS**
- 515 BUYING MEDICAL AND PERSONAL CARE SERVICES**
- 516 BUYING GOVERNMENT AND FINANCIAL SERVICES**
- 517 BUYING SERVICES RELATED TO CLEANING AND REPAIRING**

### **52 selling, soliciting markets for products**

- 521 SOLLICITING MARKETS FOR PRODUCTS**
- 522 SELLING AGRICULTURAL GOODS AND FOOD**
- 523 SELLING ANIMALS**
- 524 SELLING MANUFACTURED PRODUCTS**
- 525 SELLING OTHER GOODS**
- 526 SELLING SERVICES**

## **6. FOOD PREPARATION AND SERVING ACTIVITIES**

### **61 cooking, making drinks**

### **62 setting and serving tables**

## **7. BUSINESS ACTIVITIES**

### **71 management activities: discussing, negotiating, representing, organising, supervising, inspecting**

### **72 clerical activities: storing, filing, sorting, classifying, calculating**

### **73 collecting materials, delivering goods/Services**

### **74 Organizing and Attending Meetings**

#### **741 ORGANIZING AND ATTENDING SOCIAL MEETINGS**

#### **742 ORGANIZING AND ATTENDING PROFESSIONAL/UNION, FRATERNAL AND POLITICAL MEETINGS**

#### **741 RELIGIOUS GROUP MEETINGS**

## **8. CARING ACTIVITIES**

### **81 teaching, guiding, coaching, leading**

#### **811 TEACHING**

**812 GUIDING, COACHING, LEADING**

**82 Giving Medical Care**

**83 Washing, Dressing, Feeding, Helping**

**831 WASHING**

**832 FEEDING**

**833 DRESSING**

**834 HELPING IN OTHER WAYS**

**84 protecting**

**85 accompanying**

**9. CREATIVE ACTIVITIES**

**91 thinking, researching, analysing, programming, synthesising, designing**

**92 reading, writing**

**921 READING**

**922 WRITING**

**93 talking, socializing, hosting**

**931 TALKING**

**932 INTERVIEWING/BEING INTERVIEWED**

**933 TALKING ON THE TELEPHONE**

**934 HOSTING OR ATTENDING PARTIES, SOCIALIZING**

**94 drawing, painting, creating and performing music, acting, photographing, collecting objects, dancing**

**941 DRAWING AND PAINTING**

**942 CREATING OR PERFORMING MUSIC**

**943 ACTING, DANCING**

**944 COLLECTING OBJECTS**

**95 Physical exercise, playing and walking**

**951 WALKING**

**952 PHYSICAL EXERCISE**

**953 PLAYING**

**0. PERSONAL CARE AND MAINTENANCE, ENTERTAINMENT AND PASSIVE ACTIVITIES**

**01 eating, drinking and personal hygiene**

**011 EATING AND DRINKING**

**012 PERSONAL HYGIENE**

**02 learning, studying**

- 021 ATTENDING FORMAL EDUCATION CLASSES**
- 022 ATTENDING INFORMAL EDUCATION CLASSES**
- 023 RECEIVING ASSISTANCE/CONSULTING TUTOR, BEING SUPERVISED**
- 024 DOING HOMEWORK, STUDYING**

**03 receiving care**

- 031 BEING WASHED, DRESSED, FED**
- 032 RECEIVING MEDICAL CARE**
- 033 BEING WALKED, BEING ACCOMPANIED, BEING TALKED TO**
- 034 RECEIVING SPIRITUAL OR PSYCHOLOGICAL COUNSELLING**

**04 watching, listening**

- 041 WATCHING PERSONS**
- 042 WATCHING TV, VIDEO**

**05 relaxing, sitting, doing nothing, sleeping and ) Æ Á ®**

- 051 RELAXING, DOING NOTHING**
- 052 SLEEPING AND AFFECTIVE ACTIVITIES**

**06 attending events (museums, sports, religious)**

- 061 ATTENDING MUSEUMS, THEATERS, CINEMA**
- 062 ATTENDING SPORT EVENTS**
- 063 ATTENDING RELIGIOUS SERVICES**
- 064 ATTENDING OTHER COMPETITIONS (OTHER THAN SPORTS)**

**07 waiting**

**08 being driven**

## **Annex II: Context Variables**

### **FOR WHAT PURPOSE/ FOR WHOM:**

- 
- 1 for sale in the market/for pay, profit, family gain**
- 2 For finding a job**
- 3 for own consumption/for the family/for oneself**
- 31 FOR ONESELF**
- 32 FOR OWN CHILDREN**
- 33 FOR OTHERS IN HOUSEHOLD**
- 34 FOR RELATIVES NOT IN HOUSEHOLD**
- 35 FOR PETS**
- 4 For Voluntary and Benevolent causes**
- 41 FOR OTHER CHILDREN NOT OF HOUSEHOLD**
- 42 FOR OTHER ADULTS NOT OF HOUSEHOLD**
- 43 FOR SCHOOL**
- 44 FOR CHURCH**
- 45 FOR COMMUNITY**
- 46 FOR ORGANIZATION**
- 5 For Other Purposes**

### **WHERE:**

- 1 AT THE WORKPLACE**
- 2 AT OWN DWELLING AND SURROUNDINGS**
- 3 AT BABYSITTERS, NURSERY, SCHOOL, LEARNING INSTITUTION**
- 4 AT SHOPS, BANKS, POST OFFICE, CHURCH, OTHER PUBLIC PLACES**
- 5 AT OTHER PREMISES**
- 6 OUTDOORS, IN PARKS, FIELDS, STREET**

### **WITH WHOM:**

- 1 ALONE**
- 2 WITH OWN CHILDREN**
- 3 WITH OTHER MEMBERS OF HOUSEHOLD**
- 4 WITH PETS**
- 5 WITH RELATIVES NOT OF HOUSEHOLD**
- 6 WITH COLLEAGUES**
- 7 WITH FRIENDS**
- 8 WITH OTHER CHILDREN NOT OF HOUSEHOLD**
- 9 WITH OTHER ADULTS NOT OF HOUSEHOLD**