"Modernisation of the Harmonised European Time Use Survey"

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1. Description of the aims of the action

At the beginning of September 2017, Statistics Estonia started the activities related to the modernization of the HETUS, which next wave fieldworks are planned from December 2019 to November 2020. On 1st of September 2017, Statistics Estonia started works on the *Modernisation of the harmonised European Time Use* grant (grant number 07141.2017.001-2017.355) based on the plan and agreement with Eurostat.

The purpose of the grant (hereinafter the Action) was to prepare new solutions and evaluate the possibilities of applying them for the data collection of Estonian Time Use Survey 2019/2020. However, it became evident during the period of conducting the works related to the action that the use and integration of new methods for collecting data for TUS was unattainable for the 2019/2020 study. Nevertheless, the integration of new solutions deemed highly prospective for the upcoming projects based on the preliminary analysis by the experts and the works related to designing possibilities for the implementation of new solutions in the future was still considered significant contribution to preparing for the potential employment of new methods. Hence, the emphasis of the works carried out during the action shifted to assessing the possibilities of designing and implementing new methods for future surveys rather than preparing the solutions for the abovementioned wave of survey. Furthermore, the prospects of the use of alternative ways of collecting data with an emphasis on testing personal activity monitors were analysed. The timetable of the actions taken and planned for this grant is presented in Table 1. This objective still allows to assess whether and under what conditions it is feasible to use smart applications for time use research and which effect does the implementation of these methods has on the data submission and user feedback. Moreover, the testing of activity monitors for collecting information about the respondents' time use provides information about the possibilities of using new tools for measuring and bettering the quality of the measurements of the activities and activeness of people.

The following report gives an overview of the activities performed over the course of 01.09.2017 until 31.08.2019. The report concentrates on presenting the user feedback of different devices and approaches of collecting data, which suggest the strengths and weaknesses these tools and solutions might propose for data collection, and therefore can be considered valuable learning experiences for future research. For testing the new methods, pilot studies involving the testing the prototype of web diary and a small-scale test survey with the web diaries and activity monitors were conducted.

The paper outlines the description of the tests performed; presents the results of conducted research based on the user feedback, which touch upon the choices considered relevant when designing web diaries, and take-away points of the analysis of diary-monitor combined data. The interviews were carried out for testing the substantive structure of diary design.

It turned out during the process of investigating the possibilities for integrating the new methods and solutions for data collection for Time Use Survey that the implementation of these applications are not feasible for Estonian TUS 2019/2020 wave as originally planned. As a result of the resolution reached by the experts of data collection and management team in Statistics Estonia, the integration of web diaries and implementation of new applications for data collection were disregarded for the 2019/2020 study, and hence some of the tasks involving the preparation of integration of these solutions for the new wave of Estonian TUS were not completed. However, the prospects of switching modes of data collecting were perceived feasible and the new solutions were aimed to be tested for future research. Hence, web diary prototypes were tested for gaining insight of the possibilities of future use. The report

will end with an annex containing the English and Estonian version of the variables used in the studies.

1.1. Overview of the works related to the action

While the majority of social surveys collect paper-administered diaries proven to provide accurate and reliable daily activity estimates, the calls for introducing new data collecting methods is reasoned due to the time and financial burden the respondents and data management crew face. Thus, studying new methods for simplifying the data collection process for both sides would provide insightful information of the prospects of implementing new method-collecting instruments.

The taken and planned objectives of the action were:

1) collecting information about the possibilities of using web diaries, which includes
    a. pre-testing the designs of web diary questionnaire on small scale;
    b. conducting pilot study to test web diaries;
2) reviewing the literature and analysing possibilities of implementing methods for using smart applications (e.g. smart phones, activity monitors) for data collection. Collecting and analysing data using these applications;
3) exploring the ways of integrating web questionnaire data with the new data sources.

It became evident by August 2018 that the implementation of new methods may pose some technical problems at the moment in Statistics Estonia. However, it was decided that the possibilities for gaining information about the prospects of using these methods and applications were continued to be tested. The final decision for not implementing web diaries for collecting data for 2019/2020 Estonian TUS was presented in March 2019 by the experts of data management department in Statistics Estonia and staff involved with the tasks of the main Estonian TUS survey and given grant. It was decided that web diaries will not be used for the upcoming study due to several different technical and financial shortcomings that were hard to overcome by the time of the start of the fieldworks. The implementation of web diaries for data collection was estimated to require significant technical reconfiguration of interfacing the Observations Information System currently used for similar studies, allowing data entry through web diaries. Due to a poor response rate of the Household Budget Survey where Statistics Estonia has had an experience when it comes to using web diaries in 2015-2016 survey wave, the time-consuming and costly development of the system was considered not feasible and reasonable for 2019/2020 wave, alongside some other shortcomings. For example, the use of Observations Information System would still require the use of Identification Card, which would set a possible age-limitation to the use and prospects of web diaries. TUS aims to collect information of daily activities from members of household aged 10 and above. However, even though people younger than 15 can apply for an ID card by their guardians, the ID card itself becomes compulsory only starting from the age of 15. The respondents below the age of 15 generally do not own ID card and their possibilities to use alternative solutions for participating in study would thus be limited, which partly defeats one of the purposes of implementing the web diary option in the first place. Furthermore, it cannot be presumed the respondents have up-to-date technical tools necessary for filling in the web diary – the respondents may not have smart phones, tablets or computers and internet accessibility, which would be relevant for opting for the web diary method. It also cannot be presumed respondents want to fill the diaries only in paper or web format. This means web

diaries can be implemented alongside the paper diaries not instead of them. However, using two formats would require collecting and coding data in separate systems currently used in Statistics Estonia which would mean increased workload for managing the different systems. When it comes to the use of both diary formats, the web diary format should still have to be coded “by hand” by the coders to harmonize the data across systems. While the decrease in staff cost was regarded as one of the strengths of using web diaries, the costs allocated to staff may decrease less than expected.

The experts were also concerned that the costs the integration of new solutions may bring may not be justified: it is hard to predict the popularity of their use in light of the investments to the rearrangement of data collection systems that are needed to be made, especially due to the poor “turnout” rate of the Household Budget Survey.

However, the experts find web diaries should be implemented for data collection should it become technically and financially feasible. When the technical solutions allow the use of these tools, the benefits are presumed to outweigh some of the difficulties these solutions may bring upon. One of the best arguments would be the responsiveness of the statistics office when it comes to the expectations of the respondents as well as the decreased burden placed upon the respondents and Statistics Estonia. Based on the user feedback of the pilot studies, the web diary method was preferred and was considered positive advancement in research. The decision to not implement web diaries for the 2019/2020 Estonian TUS was due to the lack of technical responsiveness to implement this solution as well as a lack of time to prepare necessary changes in the systems of Statistics Estonia for taking up the use of web diaries by the time of the new wave of TUS.

Given action aimed to assess the possibilities of the use of web diaries and possibilities of integrating new applications for collecting information for the Estonian Time Use Survey 2019/2020 wave. Although web diaries and other applications for data collection will not be used for the 2019/2020 study, the results provide insight of the possibilities of the use of these tools for future studies and a learning experience for other countries.

2. Description of the pilot tests performed

The aim of the Modernization of the Harmonized European Time Use Survey grant was to test and propose ways of how to incorporate new tools of collecting data to decrease the time and cost burden for respondents and in terms of data management. The activities of the grant could be divided two-fold: the activities of pilot testing the proposed web diary prototype and the activities of conducting pilot survey using web diary and activity monitors.

2.1 Recruitment and sampling respondents

2.1.1. Recruitment and sampling respondents of the web diary interviews

The sampling frame consisted of general population of Estonian usual residents based on the Estonian Population Register data. In the initial sample list there were 220 men and women randomly selected from the Estonian Population Register for whom the contact information was available. People between the age of 21-60 and lived in Tallinn were incorporated. The small-scale pilot studies were intended to test the design of the web diary and the use of web diary and monitors as data collection tools as such and thus it was not considered necessary that the sample should be reflective of the whole population. As the interview and later also

survey with monitors required coming to the premise of Statistics Estonia in Tallinn or delivering the limited number of activity monitors to the respondents, respectively, the inclusion of people from the region of Tallinn was considered reasoned due to logistical closeness. Furthermore, the people from very young and older age groups were not directly intended to be incorporated into the study as they may either lack the knowledge of using smart phones in informed way without the supervision of other members of the household or they likely do not own these devices – the objective was not to compare how people from different age groups respond to the diary as a solution, but rather test the design of the diary and the potential of using monitors for data collection, for which people who are likely to adopt the solutions were decided to be incorporated.

204 people who had their e-mail addresses available were contacted via e-mail, from which 7 agreed with the interviews. The rest of the respondents were selected by their gender and age-specific characteristics from the same list and were additionally contacted via phone due to the wish of obtaining gender and age-group balanced sample. The people who agreed to be interviewed were asked to come to Statistics Estonia premise in Tallinn. All in all, 11 people were interviewed.

All the people who were interviewed during the web diary testing process received shopping center gift cards with the value of 20 euros. The individual interviews were conducted by experienced leading methodologist from Statistics Estonia questionnaire laboratory.

All the people interviewed were introduced the purpose of the interview and the principles of handling personal information. One interview lasted on average 45 minutes. The interviews were recorded and transcribed during the process of conducting interviews. Participants were introduced the objective of the study and the protocol of personal data use, including the anonymity, confidentiality of information, and freedom of declining from the sharing of information at any point during the study.

The main characteristics of the people who were interviewed during the web diary testing are the following:

- All in all, 11 people were interviewed for testing the web diaries (without activity monitors).
- Gender: 4 men and 7 women were interviewed.
- Age-group: 3 respondents below 24, 5 respondents aged 25 – 39, 3 respondents from age–group 40-54 who agreed to be interviewed.

The expert conducting the interviews used the methods of cognitive interviewing, core techniques of verbal probing, paraphrasing and in some cases also think-aloud method for testing the web diaries. Additionally, computer monitoring software Snagit was incorporated for testing the questionnaire as an additional measure for analyzing the respondents' answers.

Originally, maximum of 50 respondents were aimed to be incorporated for web diary and web diary with activity monitors test groups. However, the in-depth interviews alongside the use of monitoring program and the continuous qualitative analysis allowed to determine the occurrence of data saturation at around 10 interviews. Furthermore, as the web diaries were also tested by the pilot survey test group, total of 36 respondents assessed the solution, from which 11 provided in-depth knowledge of the questionnaire and web diary application through the interviews. Hence, no more than 11 people were interviewed as it was estimated the addition of the interviewees would not provide additional information to the study and would not be reasoned.

2.1.2 Recruitment and sampling respondents of the web diary and activity monitor testing

The sampling frame consisted of general population of Estonian usual residents based on the Estonian Population Register data. The same list was used for finding participants for the pilot study as for testing the web diaries. For recruiting the respondents for the pilot study, the people on the list were contacted via email or phone. It was aimed to incorporate people from different age groups, families with children (to test the use of monitors and diaries for the whole household), and people holding different occupations. 19 people agreed to participate in the study. Upon gathering additional information about the participants who initially agreed to take part in the survey and determining other potential and willing test subjects from their household (e.g. children, spouses), all in all 25 people took part of the study testing the use of activity monitors and web diaries simultaneously.

The participants were visited by the conductor of the survey who was responsible for preparing and guiding the respondents of the use of monitors and diaries. Participants were introduced the objective of the study and the protocol of personal data use, including the anonymity, confidentiality of information, and freedom of declining participating in the study at any given point should they wish so.

The people who participated in the pilot study received shopping center gift cards with the value of 20 euros. The respondents did not have to come to the premises of Statistics Estonia - the expert responsible for carrying out the field works of the pilot survey visited the participants at their home, delivered necessary equipment and introduced all the information regarding the participation.

The main characteristics of the people who participated in the web diary and activity monitor testing are the following:

- All in all, 25 people participated in the testing of the web diaries with activity monitors.
- Gender: 7 men and 18 women
- Age-group: 6 respondents aged 10-24, 6 respondents aged 25 – 39, 12 respondents from age–group 40-54 and 1 respondent above the age of 55 who agreed to participate in pilot survey.

During the pilot survey, web diary was tested alongside the activity monitors. The prototype of the web diary tested and the activity monitor used was selected based on literature reviews and pre-testing the solutions and devices among Statistics Estonia experts (results are elaborated in the next chapters). All of the participants completed the study (i.e. no-one quit half-way through), which gives complete data on participants' self-reported and auxiliary information during the period of study.

2.2 Results of the performed pilot tests

2.2.1. Overall summary

Total of 36 people participated in the pilot studies aimed to test the design of web diary format for the use of TUS or other similar studies, as well as for testing the prospects of the use of activity monitors for data collection. 11 people were interviewed and 25 participated in pilot survey.

	Web diary interviews	**Web diary and monitor survey**
Gender		
Male	4	7

Female	7	18
Age		
10-24	3	6
25-39	5	6
40-54	3	12
55+		1
Total	11	25

The pre-testing of web diaries confirmed the overall preferred format for web diaries: for minimising the time-consumption and coder-bias, classification of actions with 36 prescribed activities instead of free text filling was perceived having potential for decreasing the amount of time respondents would have to spend on filling in the activities as well as it has a potential of decreasing the chances of recall errors when filling in the diary later. The classification of actions was based on the coding schema derived from the earlier waves of Estonian Time Use Survey, where the common activities were categorized into hierarchies of main actions, which had several sub-categories. The pilot study interviews had an objective of determining how well the hierarchy of these classifications would align with the respondents' self-reported activities.

The interviews revealed respondents occasionally reported difficulties when trying to put down their activities based on the prescribed classification of actions. This might indicate the classification needs more specification or subcategories to align with the activities of the respondents than originally structured. For example, the greatest difficulties could be observed in terms of how the respondents understood travelling. The respondents instinctively wanted to add the purpose of the travel and reported problems when it came to understanding how to fill in the information about this activity. This indicates respondents may need further guiding when it comes to actions related to travelling from one place to another.

Furthermore, the classification of childcare caused misunderstandings. The respondents defined it more as a service. Moreover, they emphasised childcare should be specified in terms of the activities being done with children (e.g. just spending time with them *versus* also educating them) and based on the age of children (younger kids need more supervision).

Another problematic classification was involved with "shopping and services". The respondents were unsure of how to define "personal services".

There were other observations the respondents highlighted in terms of understanding and aligning the prescribed activities with their perceived real-life activities, however they were mostly single-occurring instances. For instance, it caused difficulties determining whether social life refers to face-to-face interaction or does it also encompass communication via phone, computer etc.

The feedback to web diaries as a solution was positive. Respondents were especially keen on the idea of using app services for data entry. The negative inferences the respondents reported when it came to web diaries were due to problems with using the app, which meant the respondents were sent personal links as an alternative option. This was not as convenient for the respondents. In itself, this indicates web diaries are especially prospective when the design and systems are supported by a corresponding app. Filling in the diary online using net links did not necessarily foster respondents' behaviour in terms of their tendency to report the activities immediately after performing them. Instead, since the activities were harder to fill in using separate links, respondents tended to fill the diary in at the end of the day, which caused recall issues. These issues could also be observed when comparing the information with the activity monitor data.

Although web diaries were seen as positive solutions for data collection both by the respondents and were considered innovative and prospective by the experts of Statistics Estonia, it was decided that web diaries would not be implemented for the Estonian Time Use Survey 2019/2020 wave due to spike in costs and lack of time the rearrangement of current data collecting systems would require. Furthermore, based on the feedback provided by the participants, web diary solutions would be beneficial and target the concerns current paper diaries pose especially when an app version of diaries would be taken to use. This type of diary entry environment would be more simple and effortless to use from the standpoint of the respondent as well as would allow to add additional notifications, reminders or questions by survey conductors to guarantee the participants enter their data as frequently and accurately as possible. Similarly, since the security problems with the app were not overcome during the action by the IT specialists, the transition to web diaries without app version was not considered wise.

The analysis of activity monitor and web diary combined data suggested monitors could provide valuable information, especially for comparing the entries and evaluating the accuracy of the results. Activeness levels of the respondents indicated they had occasionally over- or underestimated the time they had marked down for an activity. In lights of this pilot study, this indicates monitors would be useful in determining and possibly overcoming recall problems the respondents face. When being able to access the data, the respondents could use it for fixing their entries. However, the monitor-administered data is not a real-time data, and hence the respondents nor statistics office do not have competency or time, respectively, to fix the illogical entries. Should the technical solutions for future research allow the addition of GPS movement tracking, the option of pre-filling the diary could be considered feasible and should be tested separately. Moreover, as the level of activeness when it comes to the performance of certain actions differed notably across participants, it could also be considered that the addition of monitors would allow adding another variable for measuring the activeness. It could be measured how active people were while performing their everyday activities in addition to gathering information about how much time people have spent doing certain activities.

2.2.2. Web diary questionnaire

Web diary pre-testing

The majority of social surveys collect paper-administered diaries, which have been shown to produce the most accurate and reliable daily activity estimates, but which burden the respondents and are costly when it comes to data management (e.g. data entry, coding). The use of new technologies for data collection could address these weaknesses by providing less burdensome diary instruments, improving data quality, and simplifying post-fieldwork data coding costs.

The first objective of the study was to pilot on small scale the use of web diary questionnaire for seeing the prospects of the implementation of web diaries for data collection in Estonian Time Use Survey. Different designs for the web diaries were pre-tested to determine the best option for diary format that would work well on all devices (e.g. mobile phones, computers, tablets) and would be easy to use for the respondent.

Web diary environment and prototype were pre-tested by the experts in Statistics Estonia using Time Use Survey 2009/2010 questionnaire. Carried out by the August of 2018 – prior the pilot study of web diaries – this allowed to determine the preliminary structure of the outlooks of the

web diary based on user experience. During the pre-testing, the information was collected about the convenience of filling the diary in smart devices:

- without predefined main activities i.e. free text filling;
- with predefined main activities (36 categories in total);
- without well-being scale;
- with wellbeing scale (7 levels).

All the pre-tests were carried out together with activity monitors in order to later analyse the coherence between activity monitors' and diary data and determine the most accurate monitor for survey-testing.

Originally, one of the objectives of the action was to design different prototypes of the diary questionnaire using different web environments and compare the prototypes by using feedback received from interviews with the test users. However, the preliminary analysis of the possibilities of the integration of available systems for implementing web diaries indicated the appearance of potential problems that were seen detrimental to the efforts of being able to start using web diaries already for the 2019/2020 HETUS wave. Thus, different modes and approaches to web diaries were pre-tested by experts and the most suitable option was tested on a small-scale with pilot studies . The format of the web diaries was tested on the participants of pilot study by using individual interviews. The aim of this task was to additionally test the suitability of the classification of actions i.e. the codes that have been attributed to the free text filled entries by the respondents in earlier waves of TUS, for easing the diary-filling experience,.

The diary prototypes were elaborated using Google forms to adapt the recommendations of the experts immediately.

The creation of diary entries was tested in two ways:

1. at the beginning of the activity as it is the logical step according to paper diary, but also,
2. at the end of activity.

The second practice appeared to be more suitable as it allowed more freedom for the respondent – the details of actions cannot be foreseen before the action itself occurs. It also allows to give accurate answers to the questions regarding the feelings of satisfaction (i.e. the question: "How much did you enjoy this time?") during the activity. When entering the information prior the activity, the respondent can merely presume the attitude, whereas recording the feeling after the activity allows to truly assess how the respondent felt at the time of action. The testing of web diaries on larger-sample pilot study also later confirmed that the respondents preferred entering information of activities after finishing them.

As a result of pre-testing by Statistics Estonia experts, it was determined that web diary entries would deem beneficial and less burdensome both for respondents and Statistics' office when it encompasses the classification of actions. Therefore, the classification of actions and how well it represents the actual understanding and behaviour of respondents' actions was tested. This gives an important insight to how well the coded actions align with the understandings of the respondents, which is not only useful for the input of creating web diaries for similar studies in the future, but also has a potential for giving input for bettering the work of the main survey itself. As some of the studies that have been done on the topic have rather opted for the free-filling options, testing the classifications for capturing respondents' day-to-day activities has a different approach to collecting data for TUS-style surveys. The well-being (satisfaction) scale was also included in the pilot study.

The objective of pilot study was to collect data by using the best web diary prototype in HETUS 2019-2020. Thus, the results were used to develop a working prototype for the use of pilot testing on a larger group of respondents alongside the monitors. As it was determined the use of classification of actions is the add-on that would simplify and decrease the burden for respondents and statistics office, the use of activity options based on the hierarchy of classification of actions was tested on the respondents. The preliminary prototype for testing the web diary with monitors for the second pilot study was open to changes. Using interviews, the aim was to determine the pros and cons of using classifications and how the hierarchy of classifications should look like. Although web diaries were not implemented for this wave of TUS in Estonia, it gave an important input when it comes to designing the diaries in the future.

Web diary pilot study

Based on the preliminary prototype tested by Statistics Estonia and using the predetermined classification of actions used for coding the activities in the two previous waves of TUS, 11 in-depth interviews were carried out. The interviews shed a light on both the design elements of the web diary structure as well as the structure and accuracy of the proposed classification of actions, the latter of which was deemed an important element when constructing the web diaries as it would have truly provided an opportunity to lessen the time respondents have to spend on marking down their activities as well as statistics office for coding them. It was presumed that once the data entry would be simplified, and alongside the technical opportunities to enter the activities as they take place (not in a 10-minute time sloth), people would be more open to report their activities more accurately, i.e. they would also report the activities they do less than 10 minutes. For this sake, 12 wider categories of classifications were presented for self-coding of daily activities, each of which have several subcategories:

- being at work or studying
    - working time in main job
    - study
- childcare
- being on the move
- social life, entertainment, culture
    - entertainment and culture
    - social life
- filling in the diary
- helping, caretaking, voluntary work, participatory activities
    - participatory activities (meetings *etc*)
- household chores
    - gardening and pet care
    - household upkeep
    - house constructions and repairs
    - handicraft and producing textiles
    - other specified food management
- personal activities, sleep, eating *etc*
    - eating
    - sleep
    - other specified personal care
- reading, media, music
    - television and video
    - radio and music
    - reading

- shopping and services
    - personal services (excl. medical services)
    - medical services
    - shopping
- sports, hobbies, games
    - hobbies and games
    - productive activities in nature (fishing, hunting, mushroom foraging *etc*)
    - sports-related activities
- other activities
    - other personal activity

The use of Snagit software was intended which allowed online screen recording to track the user's experience with filling in the web questionnaire. This programme was essentially aimed to be used for testing how respondents fill in different prototypes of web diaries created by programmer employed outside Statistics Estonia. However, as the potential implementation of web diaries was postponed and the procurement of employing the programmer for creating and integrating diary formats did not succeed, the aim of using the programme was different. Snagit was used for additional help for carrying out the feedback analysis. For example, it helped to simplify and fasten the process of reaching the important information by allowing to add notes and copy them or the recorded videos of users' behaviour to other relevant files. Furthermore, the programme deemed especially useful when accounting its role in distributing the information obtained during interviews to the data management team the comments of respondents gained a clearer context, which was helpful during interpreting the results.

The study determined respondents occasionally reported difficulties when trying to put down their activities based on the prescribed classification of actions. The results of the interviews are presented by the main categories of classifications that were perceived problematic throughout the interviews. This indicates some of the difficulties that should be considered in the future when the diaries were designed based on the pre-coded categories of actions. Other classifications of actions posed problems on lesser occasions and did not occur throughout the respondents' feedback.

Travel

When marking down the travels, the respondents were unsure of whether they should report the place **where** the travel **took place**, the place **where** they **intended to go**, or the **way how they travelled**. It was further complicated when the travel was seen as a purposeful action, such as visiting someone. The respondents reported they were also confused when the action of travelling from one place to another did not change, but the mode of transportation changed – for example, the respondent presented an occasion where they would walk on foot as well as drive a car to get somewhere.

Use of computer and the Internet during main activity

Some respondents were unsure how the use should be marked: if they used computer or internet for 5 minutes during a, for example, 4 hour time sloth, should it still be marked down.

Doing activities together / alone

Respondents were unsure when to mark when they did the activity alone. For example, the respondents were not sure if the activity should be considered being done alone when the activity itself is done individually (such as work-related tasks) despite being in the same room with other people. It came out from the responses that the participants would report this information differently, depending on how they understood “being together” or “alone”.

Classification of activities: being at work or studying

Generally, this category did not indicate notable discrepancies in understanding the classification and activities. Some concerns arose when participants were unsure how to categorize studying in university when also working: should it be considered hobby or studying.

Notes: Specification may be necessary for guides for coding studying when working.

Classification of action: childcare

The respondents reported they perceived **childcare** hereby as a **service** (i.e. looking after someone else's child and getting paid for it instead of caring their own child). Childcare relates to a job of being a babysitter and refers more to looking after or just spending time with a child. They distinguished it from spending time with their own children – when it comes to their kids, they would differentiate the time they spend with a child (babysitting) from purposeful activities that develop the child (e.g. communicating, teaching, playing games). Furthermore, it remained unsure for how long should the activity of spending time with a child be considered "childcare" – the respondents mentioned children under 7 would require more supervision and spending time with them could be considered babysitting, whereas for older kids, they would categorize the action more in lines of communicating or teaching.

Notes: The respondents brought out that "childcare" would still encompass very different activities that could be categorized differently each time. For example, they were unsure of whether clothing the child should be considered babysitting or childcare. Moreover, waking the kid up, driving them to the kindergarten could be considered personal activity, rather than childcare. This indicates the ambiguity of given classification of action and should be specified. Partly, the difficulties arising from this classification are due to the linguistic specifics of Estonian language – the local phrase for corresponding code is *lapsehoidmine*, which can be an ambiguous term as it can refer to both babysitting as supervision of a child and other activities being done with children. The thorough coding schema of TUS differentiates activities related to childcare and should be employed when displaying the list of activities to the respondents for the prefilled hierarchies.

Classification of action: social life, entertainment, culture

The respondents reported difficulties in trying to determine whether social life would also refer to communicating through using mobile phones non-verbally (i.e. through social media).

Notes: The "social life" category should be specified for future research when using predetermined classification of actions like in tested web diaries. TUS coding schema distinguishes communicating styles, however the actions were combined for the pilot studies to simplify the process of data entry for the respondents. When it comes to this category, the specification would still be needed.

Classification of action: household chores

When it comes to household chores, the respondents generally agreed upon the most basic chores they would mark down (such as cleaning, doing laundry, preparing food *etc*). Household upkeep caused some problems. Some respondents were unsure what was meant by this classification and thus considered it as a time spent for "doing the documentation work" (i.e. paying the bills, creating cleaning schedule). The responses of the interviewees did not indicate notable discrepancies in the understandings and self-coding of daily activities.

Classification of action: shopping and services

The respondents had difficulties understanding what the personal services refer to. It remained unclear whether it should be considered a service an individual pays for, goes to a certain place to obtain it, or how "individual" the service has to be in the first place to be considered one. For example, the respondents defined personal services in terms of paying for a personal helper, but also as paying for a beauty technician service.

Medical services also posed certain questions. For example, the respondents agreed doctors' visitations should be considered medical services. However, they had different stances of whether the visitation and consultation with pharmacist should be considered medical service.

Notes: The term of "services" should be specified.

Classification of activities: sports, hobbies, games

Sports was widely considered in terms of working out. However, the respondents were somewhat unsure of whether certain sports games, such as basketball, should be considered sports, games or hobbies. Light activities (morning stretching, meditating) were hard to categorize – participants were unsure whether to classify these as sports or personal activities.

Notes: Specification may be necessary when combining these activities. TUS coding schema has distinguished different activities, however the application of this version of web diary design should include specifications.

The feedback of the web diary as a solution was overall positive. While the substantive questions regarding the structure of the classification of actions and web diaries were studied more in depth with the interviews, the feedback to web diaries was also asked from the participants of web diary and monitor combined pilot survey. The participants of pilot survey reported they mostly had no difficulties finding suitable activities from the prescribed classification of actions. Some respondents reported difficulties when trying to categorize their activities and it was suggested there should be an option for free text filling for these occasions. This could be also partly addressed when the full list of codes used for coding the free-filled activities in TUS would be displayed – although it might take longer for the respondents to orientate in the list of answers, it could produce more accurate picture of their specific activities. Furthermore, the respondents emphasised that the possibility for going back to their entered data should be ensured in order to be able to correct the entries as well as for being able to remind about the daily activities based on already entered data. In some occasions, the participants reported the need to alter their data entries, especially when they had been busy and had not had time to fill in the information about the activities right after doing them. The web diary was considered a good solution if the possibility to fill in the activities one-by-one was provided. This was also intended with this study, however the technical difficulties with the app required changes in the outlooks of the web diary link that was alternatively created to replace the app. While it was estimated that the diary-filling habits of respondents differ (i.e. some people prefer to enter the information right after the activity whereas others prefer to do this at the end of the day), a middle ground of entering three activities with one link was found suitable. Thus, three main activities could be entered at the time after which the link had to be saved. Some respondents found that three actions was too much – these respondents mainly also preferred entering their activities right after the activity had taken place and they then had to finish at least three activities prior being able to save their information. Often, this required

marking their activities down elsewhere to provide accurate data. Other respondents found three categories too little – these were mainly the respondents who preferred to fill in the diary at the end of the day and had to continuously save and re-open the links to fill in their information. These problems would be avoided by using an app, which saves one activity at a time and does not require multiple saving and re-opening of the links in order to enter data. This way, the different preferences and habits of reporting data across the respondents would be ensured. The freedom to fill in one activity at the time was emphasised on multiple occasions. Given one of the main benefits of implementing web diaries would be overcoming the recall issues, this would also help in increasing the accuracy of the data. The use of web diary as such would not be beneficial in terms of overcoming the recall issues if the respondents enter their information at the end of the day and thus the entries right at the end of the activities should be encouraged – employing apps for this seems prospective based on the feedback of pilot study participants. Also, the time sloths of activities should be observable for the respondents (this was not available to respondents in given study due to technical difficulties with the app) as they would otherwise not remember the last entry and should still mark it down elsewhere to provide accurate entries. Abovementioned information should be considered when designing technical solutions for web diaries.

2.2.3. Smart applications: web diaries and activity monitors

The implementation of smart applications

For determining the possibilities of the implementation of smart applications for data collection, literature was reviewed and different devices tested for selecting the most suitable options for employing them for conducting the pilot studies. Different activity monitors were pre-tested by the team in Statistics Estonia to find the most suitable ones for conducting the study. A variety of monitors, both professional and commercial, were tested. Furthermore, computer monitoring software was tested and the systems for designing and collecting web diary data from were assessed. Testing the applications involves following steps: testing the data collection process, testing the data access and possibility to adjust the settings of the application, testing the data delivery, testing possibilities of integrating the applications into current IT environment, users' feedback on the experience of using application. For conducting the pilot studies, one wearable fitness tracker and one monitoring software was chosen for data collection.

Initially, both commercial as well as professional personal activity monitors were planned to be tested. There were in total 19 commercial personal activity monitors proposed among which we were choosing some items for testing (see for Table 2).

Table 2. Reviewed activity monitors.

Brand	Price €	Display/watch	SIM card	GPS	Water resistance	Battery durability	Step counter	Sedentary reminder	Heart rate	Sleep monitor
Apple watch series 2	350	Y	N	Y	Y	18 hours	Y	Y	Y	Y
Fitbit Charge 2	150	Y	N	N	N	5 days	Y	Y	Y	Y

Samsung Gear Fit 2 Large Black	150	Y	N	Y	Y	3 days	Y	?	Y	Y
Skagen Hagen Connected Leather Hybrid Smartwatch	136	Y	N	N	3 ATM	? (several months)	Y	?	N	Y
KingWear KW88 3G	95	Y	Y	Y	life waterproof	350mAh	Y	?	Y	?
TomTom Spark 3	90, 95	Y	N	Y	Y	14 days	Y	?	Y	Y
Makibes Talk T1 3G Smartwatch Phone	90	Y	Y	Y	?	350mAh	Y	?	Y	?
Withings Go	80	e-ink	N	N	Y	8 months	Y	?	N	Y
Misfit Ray	75	LED lights	N	N	Y	Up to 6 months	Y	?	N	Y
Jawbone UP3	35	LED lights	N	N	life waterproof	Up to 7 days	Y	Y	Y	Y
S908 GPS Sports Smartband	34, 97	Y	N	Y	IP68	20 days	Y	Y	Y	Y
NFC QS60 Smart Wrist Band	34, 63	Y	N	N	Y	25 days	Y	Y	Y	Y
Zeblaze Cosmo Smart Watch MTK2502	32	Y	N	N	IP65	72 hours	Y	Y	Y	Y
ZUCOOR Smart Bracelet	29, 16	Y	N	N	Y	7 - 10 days	Y	Y	Y	Y
Xiaomi Mi Band 2	22	Y	N	N	IP67	20 days	Y	Y	Y	Y
Misfit Flash Link	20	LED lights	N	N	Y	Up to 6 months	Y	?	N	Y
Z6 Plus Heart Rate Smartband	19, 45	Y	N	N	IP67	10 days	Y	Y	Y	Y
Zeblaze Zeband Plus Smart Wristband	17, 69	Y	N	N	IP67	15 days	Y	Y	Y	Y
Xiaomi Mi Band 1S	7,61	LED lights	N	N	IP67	30 days	Y	Y	Y	Y

Main criteria for choosing the monitors were the functionality (ability to provide different data), reliability in active usage and duration of the battery.

Two different Fitbit Charge 2 models and Jawbone UP3 stood out as having the most potential for data collection. They do have some flaws: the price is rather high, there is no GPS, and Fitbit model is not waterproof, but they still provided the best quality and measurement options in this price range – Fitbit has optical heart rate sensor and jawbone UP3 bio impedance sensor. GPS would have been preferred in terms of testing the possibility of pre-filling the

movement-related data. However, as this addition also drains battery and it cannot be expected the respondents to be responsible for recharging the devices during the study, the criteria for GPS addition for disregarded – the technology hereby sets limits to the possibilities of prefilling the diaries.

Additionally, some professional activity monitors suitable for scientific research were tested. GENEActiv Original and Axivity AX3 stood out based on their technological advances. However, there was no successful contact with the seller of GENEActiv monitor. Furthermore, the cooperation and feedback from researchers who have used monitors in their studies indicated Axivity AX3 may perform better. For example, SHARE test group recommended the use of Axivity monitor. Thus, the testing was done only with the Axivity AX3 monitors.

Upon testing both commercial and professional monitors, some problems arose with the former ones (specified in Table 3), further suggesting these types of monitors should be disregarded when conducting the pilot study and should not be considered the most viable options for mass data collection. The commercial activity monitors were tested on the same time on one person for several months. During the testing, Jawbone UP3 device reported most of the days approximately 20% less steps than Fitbit Charge 2. The maximum difference was approximately up to 60%. By May 2018, unexplainable jumps in step count of the Jawbone UP3 device were recorded, for which no information of these unexplainable changes were shared by service provider. Although there was little difference when it comes to user comfort between the commercial and professional monitors, far significant problems arose in terms of data accessibility.

Table 3. Comparison of professional and best performed commercial monitors.

Axivity AX3	Fitbit, Jawbone
Data transmission -	Data transmission -
tracker > server (NSI)	tracker > cellular phone > server (service provider) > API > server (NSI)
Raw data (movement, temperature, light)	Codified data (steps, heart rate)
Analysis tools and metadata	No analysis tools or metadata
Main data - sleep, activity zones	Main data - sleep, steps
Device reliability - good	Device reliability - poor
Possible usage in the future - likely	Possible use in the future - unlikely

Data transmission is a complicated and time consuming task when it comes to commercial solutions. The recorded data has to be transferred by Bluetooth to mobile device, which has a specific application created by the service provider. However, the raw data and especially the detailed data (for example data of 1-minute intervals) is not accessible in mobile device, as it is transferred to service provider's server. In order to use raw data, an application programming interface (API) has to be separately created and only then can the raw data be transferred to NSI by API. This is possible – for example, during the grant, the data could be obtained thanks to the tehnical support of Software Technology and Applications Competence Centre (STACC) in Tartu – but it would require additional staff and take longer time, which defeats the purpose of the idea of implementing new solutions.

At the same time, data transmission from the Axivity AX3 device is done by wire, which connects the device and NSI's computer. It requires skills that are easy to obtain via training even without needing IT background-knowledge. The data transmission takes about 5 – 10

minutes and the data of several devices can be downloaded simultaneously. The Axivity AX3 is more suitable for large surveys in acquiring data from the activity monitors.

The commercial activity trackers provide codified data (usually by one minute timeslots) on Calories, Distance, Elevation, Floors, Heart rate, Steps, Sleep state, Intensity level. While heart rate is measured and recorded directly, other variables are interpretations (estimates) based on movement and heart rate data. The estimates are calculated by the service provider and methodological details i.e. how these indicators are calculated are not available for users of their services. The purpose of the commercial activity trackers is to provide ready solution for the individuals, but fail to provide detailed data for research purposes.

Axivity AX3 records data on movement (and more specifically, acceleration) in 3 axis, and also records temperature and light. The raw data is downloaded to computer by OmGui application. OmGui application provides also general and adjustable analysis tools for tracking sleep and activity zones of the respondent.

It has to be mentioned also that Axivity AX3 is more durable, than commercial devices. Its energy consumption depends on set frequency and sensitivity of the device. Device can be set to record movement in predefined period. Until that the device may stay on standby mode which consumes minimum energy. It has been noted in manual that fully charged battery may keep internal clock of the Axivity AX3 running up to 100 days and then still have sufficient energy for recording activity for a week. That is compliant with HETUS diary requirements.

Another issue is to maintain comparability with similar surveys. It is possible to maintain comparability if the methodology of the analysis is documented. Another problem is that commercial devices are developing fast and they will be outdated and probably removed from the use more quickly than Axivity AX3 with its simplicity and modest design. Despite the attractiveness and richness in features for the individual users, the simplicity and robustness of Axivity AX3 activity monitors gives more opportunities for the systematic research of larger groups of people.

The commercial mobile app SmarterTime was also tested during the grant. SmarterTime was tested because of the availability of recording predefined activities, respondents' mobile device usage, calendar entries and also location of the device at the same time. SmarterTime also allows to download data directly from the service provider which is complicated task when it comes to other service providers (such as Fitbit or Jawbone). SmarterTime has shown success because it is quite well-adjustable by users' needs and has some automatization, e.g. it allows to use the data of the previous diary entries allowing to track some activities automatically by the movement and location of the respondent. At the same time, this automatization does not work flawlessly and needs constant attention of the respondents who have to correct the entries that SmarterTime has "guessed". Our decision after its test showed that despite of the good attempt to gather the data of different sensors of the mobile device it would be difficult to use it for the survey like HETUS because it still requires a lot of attention of respondents and does not have good option to administer bigger sample of several thousand respondents at the same time. Another problem that we faced was that SmarterTime was not possible to be installed on older versions of smartphones and the conductor of the survey cannot assume that all the respondents of the HETUS have the smartphones with needed requirements. Also, as the SmarterTime app is designed by private company for personal use, a free mobile app compliant with the needs of survey would be more advised to be used for conducting research.

As Statistics Estonia has had an experience using data entry environment Limesurvey for web data entry in previous studies (Household Budget Survey in 2015-2016) and it proved successful in terms of technical possibilities of integrating the systems with the official systems

of Statistics Estonia, LimeSurvey proved a viable option for web diary environment. Additionally, the option for offline data entry made LimeSurvey a feasible option for data entry system.

The aim was initially to test to what extent it is possible and what are the preconditions (e.g. for IT infrastructure, smart application platforms) for such data integration. However during the first half of the grant it became evident that integration of several devices and instant prefilling of the diary from other devices is not realizable before HETUS 2019 – 2020 and the solutions cannot currently be implemented for data collection in Statistics Estonia. Nevertheless, the results provided by given grant should be considered especially valuable in terms of future studies.

Web diary and activity monitors pilot survey

A small-scale pilot study was conducted with 25 participants to test the use of activity monitors and web diary. This allowed an opportunity to collect data of the activity of respondents as well as map the process and technical prospects of including activity monitors for future research. Furthermore, the user experience was aimed to be collected and reported.

The pilot study turned out to be more time consuming than originally planned due to some technical difficulties (e.g. problems with the usage of app) and unforeseeable circumstances (e.g. participants' busy schedules). The LimeSurvey app environment planned to be used for web diaries failed to work outside the secured Statistics Estonia network. The problem was tried to be solved with the help of IT department. However, it turned out that the regulations of service provider did not allow safe entries outside official network and the problem could not be solved by Statistics Estonia experts. The app could thus not be used for conducting pilot survey and personalised links for all the participants had to be created as an alternative option. Due to this difficulty, the data collection for the pilot survey took a month longer than originally planned.

The process of conducting pilot study with web diaries and activity monitors went as following: the pilot study data manager arranged meetings with the participants of the study to deliver the monitor. The monitors were programmed and pre-set to start and end recording of the activity at the agreed dates for 48 hours. During the meeting, the conductor instructed the respondents in terms of how to use the device as well as introduced the logics of filling in web diary. The participants received personal links that allowed the access to their web diaries.

Overall, the user feedback for using activity monitors was positive. It was emphasised that since the monitors do not require any additional input with regards to entering information or other tasks, they were a lot less intrusive to participants' everyday life than web diaries. The only negative inferences were involved with discomfort of the use of monitors in some situations which should be considered when the use of activity monitors for research purposes is planned in the future. Technical devices themselves pose certain limits for collecting data throughout all of the activities (e.g. although relatively heat and water resistant, it might not be suitable for use in high temperature environments like sauna). This indicates the use of monitors should be accompanied by the official protocol for use, which helps to inform the respondent about the possible limitations of using the devices. As the pre-tests did not indicate significant changes in activity levels when it came to the placement of activity monitors, the participants could choose the placement according to where it was most convenient for them. The participants mostly used monitors on their wrists or ankles, and on lesser occasions on

their thighs. In conclusion, the monitors themselves did not pose discomfort and went unnoticed by the respondents.

Although personal activity monitors are easy to use for the respondents, they still require extra logistical task for the conductor of the survey. The monitors need to be programmed, pre-set, charged, emptied from data when it comes to technical tasks, but the correct use, time spent on delivering the monitors and instructing respondents on the use of monitors should be considered once the activity monitors are considered to be used for studies in the future. Furthermore, for studies with a sample of several thousand people, there has to be sufficient amount of monitors that are in use at the same time. Moreover, the sufficient amount of monitors should also refer to the number of activity tracker devices that could effectively cover the needs when considering the time spent on preparation, logistics and acquiring data from activity monitors in between the respondents. For this study, the average time of the use of activity monitor for one person, i.e. the period of time from when the participant received activity monitor until the next participant received it was 7 days. Different factors affect the time span, for example how available was the participant for meet-ups, the weekend, distance, unplanned events in participants' schedules etc. This all should be considered when planning the use and effective number of monitors needed.

However, even though the web diary format received overall very positive feedback, it also had some negative inferences. Mostly, these negative assessments were involved with the fact that the app originally aimed to be used for elaborating the web diary format did not work outside Statistics Estonia secure internet network. Upon analysing the problem, the IT department and data management experts in Statistics Estonia determined the LimeSurvey offline application could not synchronise data entries and thus forward the data to Statistics Estonia data system. Data could not be entered via this app outside the official secure network connection as the security settings of LimeSurvey only allowed administrative access attributed to users within official network. IT department could not solve the problem. For conducting the research, data management expert created temporary personalized links for accessing web diaries for the respondents. However, these links were less comfortable than the app would have been – for example, the link needed to be saved and closed before the new entry and there was no opportunity to correct these entries afterwards. At the same time, it should be noted that people did not report any negative feelings towards the web diary as a solution. This indicates that once the technical difficulties are overcome, web diaries would be greeted by the respondents. In fact, the respondents reported web diary was easy to use in different tools e.g. smartphone, tablet or computer at the same time, and different devices could be chosen for entering the data if it was needed. It was regarded convenient as respondents did not have to install anything on their devices, which could have otherwise been considered detrimental to the performance of devices in some occasions. Web diaries were perceived useful because the respondents could add entries which lasted less than 10 minutes. At the same time, it should be noted that should the systems in which the web diaries would be used in require Internet access in order to record the data, the respondent has to correct the timestamps later or add additional information far after the activity. This would decrease the benefits of web diary implementation in terms of lessening the recall error of the respondents. The chosen environments should thus preferably enable offline data entries.

As a result of conducting pilot study using web diaries and activity monitors on small-scale, the data about the levels of activity and the self-reported activities of the diaries were collected and combined. Based on the data available from the devices, it was planned to explore the ways of how to integrate the web questionnaire data with the new data sources. One of the options to consider was the possibility of pre-filling the Time Use Survey diary with the information from the two abovementioned data sources.

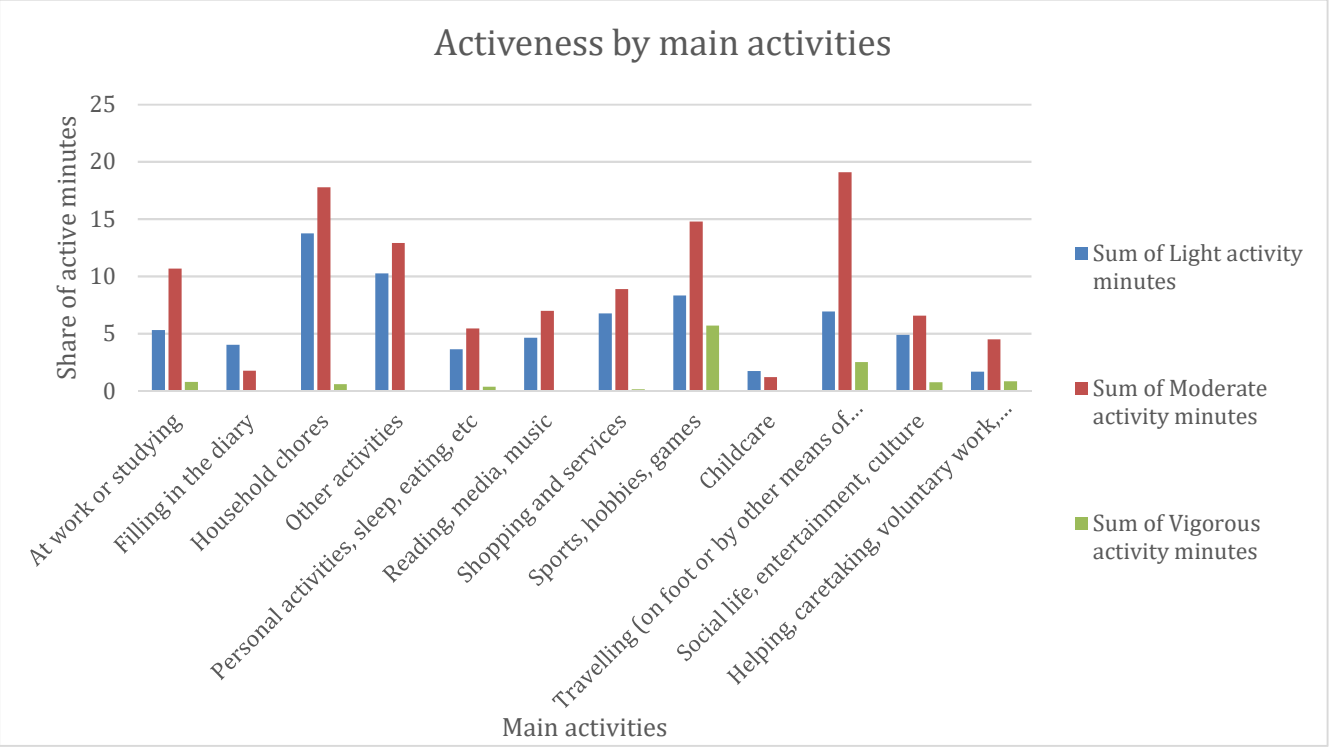

Figure 1. The level of activeness by main activities.

Upon analysing the combined data, it became apparent that while for the most part, respondents' reported activities and the accompanying activity level could be presumed to go hand-in-hand with their relative activity level (for example, the activities usually related to physical activeness, such as sports, went hand-in-hand with the increase in respondents' levels of activeness as can be seen from Figure 1), the differences became notable when analysing the travelling-related entries and monitors' data. All of the respondents made minor to major miscalculations when reporting the time they were travelling from one place to another – they over- or underestimated the time they spent on travelling between a couple of minutes for some respondents, but a rather significant time (about half an hour to several hours in some cases) for other respondents. This indicates that should the technological advancements allow it, monitors' data could give an important input for bettering the quality of the data. This could be especially beneficial if the web diaries could not be filled directly by using apps – when respondents have to use other means or devices for entering the data, they are more likely to fill the diaries in at the end of the day or when having a free moment, which raises recall issues. Although Axivity monitors do not have a screen and the respondents were not able to go back to their data to fix their miscalculations by comparing their data at the end of the day, the prospects of this data would still lie in being a control and comparative data. As of now, the interviewer also has a role of requesting the respondents to specify some of their entries on paper diaries should they find the elaboration necessary. Alternatively, activity monitors' data could be used to compare the activity level of the people and could act as an additional piece of information that could be used when asking the respondents to fix their entries. However, this would still require quick and real-time analysis of the data, which cannot be expected from the respondents and would require more time- and staff-capacity from the statistical office. At the same time, should the possibilities of integrating GPS data to the pre-existing activity monitors' and web diaries' data in the future, the possibility of pre-filling participants' travelling-related data would be feasible. Right now, the gathered information would not allow to make

direct corrections to participants' data and thus would not have potential for replacing existing information provided by the respondents themselves – although potentially having function for correcting and comparing the data and diary entries, the real activity of the respondents cannot be presumed and thus prefilled on the basis of their activity levels. However, for some activities (e.g. travelling), the inclusion of smart devices allowing the use of GPS without notable tradeoffs between the possibility of gathering data and at the same time ensuring the least intrusion to respondents' devices' performance (e.g. battery life).

Although as of now, the monitors could primarily provide comparative data that could be used – for example – for fixing illogical data entries, it could also provide another variable of interest to the study of people's time use. By looking at the level of activeness of the same actions (sports, hobbies, games) and across the respondents (respondents' names coded), the level of active minutes during the performance of the same activity differs for respondents. For example as can be seen on Figure 2, when looking at the time spent on participation in sports and separating the light, moderate, and vigorous activity, the level of activeness differs notably across the participants. This indicates there could be significant differences in how active people actually are in their activities – in addition to possibly controlling and fixing the data, this could provide a possibility to investigate not only how much time people spend on certain activities, but also how actively they perform in their everyday tasks.

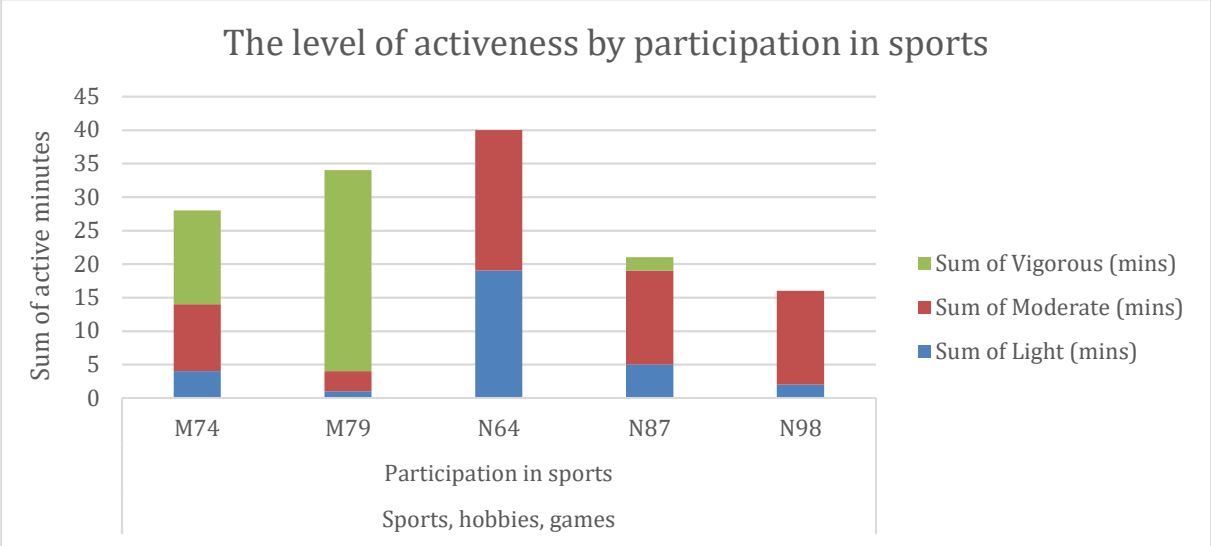

Figure 2. The level of activeness by participation in sports

Given that respondents found the use of monitors positive, i.e. they did not report any difficulties or notable disturbances due to the use of monitors, the implementation of additional solutions for data collection would offer prospective for correcting data entries, possibly pre-filling the data in some occasions, and measuring another variable when considering the level of activeness of people during their activities, the latter of which would give more thorough information about how people perform their tasks. Thus, the considering activity monitors for tracking the level of activeness of the respondents does offer possibility of capturing a more detailed insight to their behavioural reality.

When it comes to the feasibility of switching to web diaries, the solution would be especially advised when using downloadable offline apps. Based on the user feedback and overview of data submission, the analysis indicates respondents would prefer this solution and they would report their activities more accurately, which might produce more reliable data for the time use research. The tested version of the web diary resembled paper diary when it came to user

comfortability in given research – due to technical difficulties with the planned app which pertained the use of it in pilot survey, the respondents were more inclined to fill the diaries in at the end of the day or when they had a free moment. However, they did repeatedly mention the filling-in process would have been more frequent and accurate if they had had an opportunity to use mobile app. Thus, it is logical that the miscalculations of reporting the activities can be observed when comparing it to monitors' data – the recall problems remain unsolved if the web diaries themselves are not made compatible for their use in smart devices (e.g. mobile phones, tablets).

ANNEX I

Variables of the English version of the HETUS diary (not final).

1. **Time slot** (fixed beginning or end of the time allocation)
2. **MAIN ACTIVITY** *NB! Only one main activity on each line! Distinguish between travel and the activity that is the reason for travelling. For example “went to bus stop”, “went for shopping”, “did shop”, “went home” etc.
3. **Did you use a computer or Internet with the main activity?** ”Yes” mark with X.
4. **What else were you doing?** * Record the most important parallel activity.
5. **Where were you? What was the mode of transport? e.g. at home, at school, at work, at the shop, by foot, by car, by bus etc.**
6. **Were you alone or together with somebody you know?** ”Yes” mark with X. “Alone”, “With partner”, “Parent”, “Household member up to 9 years”, “Other household member”, “Other person that you know”.
7. **How much did you enjoy this activity?** (1 not at all, 7 a lot)

Annex II

Variables of the Estonian version of the HETUS diary (not final).

1. **Ajavahemik** (fikseeritud tegevuse algus või lõpp)
2. **PÕHITEGEVUS** *NB! Märkige ainult üks tegevus igale reale! Palun eristage liikumine tegevusest, mis on liikumise eesmärgiks. Näiteks: “läksin bussipeatusesse”, “sõitsin poodi sisseoste tegema”, “tegin sisseoste”, “sõitsin koju” jne.
3. **Kas Te kasutasite põhitegevuse juures arvutit või Internetti?** ”Jah” märkige X-ga.
4. **Mida Te veel tegite?** * Märkige ainult kõige tähtsam paralleeltegevus.
5. **Kus Te asusite? Millega Te liikusite?** *Märkige asukoht, kus Te tegevuse ajal olite või transpordivahendi liik, millega liikusite.Näiteks: kodus, koolis, tööl, poes, jalgsi, autoga, bussiga jne.
6. **Kas Te olite üksi või kellegagi koos?** “Jah” märkige X-ga “Üksi”, “Abikaasa/elukaaslane”, “Vanem”, “Alla 10-aastane laps”, “Muu leibkonnaliige”, “Keegi teine, keda tunnete”.
7. Kui palju Te nautisite seda tegevust? (üldse mitte1, väga 7).