

Application of the wheel of life balance to time management software

Zakusylo M. Taras

Department of Information Technology and
Computer Science
Vinnytsia National Technical University
Vinnytsia, Ukraine
taras.zakusylo5@gmail.com

Volodymyr I. Mesyura

Professor of Computer Science Chair
Vinnytsia National Technical University
Vinnytsia, Ukraine
mesyura@vntu.edu.ua

Abstract — We look at using the wheel of life balance in the context of information technology for time management. All the factors of achieving success are divided into 2 categories, specifically those are external and internal factors. For further use in the information technology the components of external factors categories are divided into following groups: social, economic, technological, geographic, political, ecological, competitive. The process of the division of the internal factors is more complicated and begins with defining the social roles, centers of character, goals and priorities. The wheel of life balance is used as a visual tool. In the process of working with this technology the user is prompted to either create the wheel of life balance out of their own values or use an existing template. To then form a strategy each value gets graded, the level of dissatisfaction is measured, “laziness and procrastination”, “fears and uncertainty” are determined. The specifics of the software product are described, namely: the process of “pulling up” the components of the wheel of life balance, study of the dynamics of changing category values, usage of labels and hashtags, division of events into phases and uniting of external and internal categories. The class diagram and the activity diagram of the software module “Wheel of Life Balance” are developed and the specifics and peculiarities of its functioning are briefly described.

Keywords — *balance, information technology, decision-making, personality traits, personality values, success, UML.*

I. INTRODUCTION

Success in life is specific to each person, but there is a common rule - successful is the one who achieves goals set for themselves. Unfortunately, it often happens that a person does not feel happy after reaching that goal. This happens because the goal was not their “own”, i.e. it is not a goal which corresponds to their particular values, priorities, or role in life. That is to say, they are living someone else’s life by reaching goals imposed by other people, circumstances, or habits. At the core of targeted time management is definition one’s personal life goals and priorities taking into account the centres of character and social roles.

One of the most common problems with time management is an imbalance. People often focus too much on one particular area of life and neglect other aspects. Time management is not only for business purposes. Blocks of time can be allocated for any important thing - such as leisure, family, hobbies, etc., which will lead to a more harmonious life.

The great importance of rational time management has led to the development of a significant number of software applications for that purpose. The book [1] notes that choosing the right time management tools is the key to doing so effectively. However, this is very difficult to implement, as it is one of the most popular categories of software applications and services. Nowadays, smartphones, laptops and other gadgets have taken over this task. The most similar in functionality are the applications Todoist, Nirvana and Time Master.

Todoist [2] is an application with a nice design and user-friendly interface designed for personal time management. It provides benefits such as setting priorities for each task, splitting tasks into subtasks, organizing hashtags, syncing with Google, compiling lists of books or movies, and posting comments on events. Disadvantages are a lack of global planning, lack of the Ukrainian language, and a lack of being able to connect with other users.

The Nirvana [3] application is designed for personal scheduling with convenient event sorting and contextual scheduling. Advantages are: synchronization with mail, generation of reports, convenient reminders, thematic sections. The disadvantages are a lack of hashtags, lack of global planning, lack of the Ukrainian language, and does not allow for comments on the events.

The Time Master application [4] is a cloud service for maintaining contact lists and tasks. Advantages are ability for corporate use, allowing for delegation of authority, contextual planning, and attaching files to events. The disadvantages are a lack of reports, lack of the Ukrainian language, lack of global planning, and no division of the task into subtasks.

As a general disadvantage of existing mobile applications, it should be noted that none of them take into account the peculiarities of balance and event planning on a lifelong scale. Therefore, the developed functionality will be able to meet greater demand.

II. LITERATURE OVERVIEW

L.M. Hallsten [5] reviews time management from different points of view, including spontaneity, balance, flexibility and time control. Company Doodle [6] explores the balance of time in terms of modern student life considering current issues and COVID-19. A study of student performance and important

issues is conducted. S. Chansaengsee [7] focuses on the impact of time management on the balance between work, life and study. The author tested the implementation of positive amplifiers and frequency collection. The Municipality of Frelighsburg has developed a handbook [8], which is intended for business management teams and organizations seeking to implement a policy of work-life balance. It offers useful tools for developing, adopting and implementing a harmony policy. Introduced the abbreviation "WLB", which is responsible for the concept of work-life balance. S. Tiroina [9] studies the impact of COVID-19 on life balance and efficiency. Based on the study of AcehDiskominfo employees, it was concluded that working from home can be an alternative to systematic work and can be implemented in modern work systems, and options for improving productivity were proposed. R. Adams and E. Blair [10] examined the performance of students and their level of anxiety in terms of balance of learning and daily life. Studies have found that time control is a factor that correlates significantly with performance.

S. Thilagavathy and S. Geetha [11] is devoted to the study of the balance between personal life and work, as well as the relationship between different behaviors. Classifications based on demographics and geography were presented. A. Consolacion and all [12] studies ways to achieve goals, and for this purpose uses a qualitative comparative analysis with fuzzy sets. It is proved that financial problems are key to the implementation of the balance sheet. S. Thilagavathy and S. Geetha [13] is devoted to the study of the balance of time considering professional sectors such as rescue services, customs, defense, etc. It is demonstrated that the influence of external factors (educational status, economic status, social origin) is insufficiently studied and is promising. J. Denstadli and all [14] examines the balance of time in terms of urban travel. Modern people spend a lot of time on the road, and this is a problem, because this time could be spent with family or to improve professional skills.

III. FACTORS INFLUENCING THE DECISION-MAKING PROCESS

We will distinguish two types of factors that affect the process of achieving success: internal and external.

$$F = \{OF, IF\},$$

where *OF* – represents external factors; *IF* – represents internal factors.

External factors include changes in market conditions, unconstructive criticism from loved ones, illness, excessive competition, war, and infrastructure. Internal factors are things such as insecurity, fear, laziness, procrastination, lack of planning, loss of concentration, and general chaos. It is important to keep in mind that it is usually very difficult if not impossible to influence external factors, which are difficult to predict and prevent.

According to the environment, we can divide external factors into 7 groups:

$$OF = \{SG, MG, TG, GG, PG, EG, KG\},$$

where SG is the societal group - representing a regional society's culture, level of education, need for self-expression, trends, and demographics [8, 11]; MG is the economic group - representing the number of available goods and services, access to information, employment rate, and payment systems; TG is the technological group - the rhythm of innovation, technology development, availability of gadgets, improvement of tools, and automation processes; GG is the geographical group - the topography of the area, remoteness from infrastructural facilities, climate, minerals, and natural resources; PG is the political group - an environment or state's political views, legal framework, provision of rights, and attitude of local authorities; EG is the ecological group - smog, levels of air pollution, water composition, and radiation pollution; KG is the competition group - the labor market trends, aggression of opponents, and the transparency of the rules of the game.

Competition could be attributed to societal factors, but it is such a large and important category that it is appropriate to consider it separately. If we do not try to abstract away the external environmental influences, it will always be an integral factor in influencing human events. The analysis of external surroundings includes a comprehensive consideration of all external elements of the human environment. The primary focus of this analysis is the identification, understanding, and consideration of the existing and potential prospects of threats which people may encounter.

The "internal environment" is a person's own potential for functioning effectively [6, 10]. The process of defining the internal environment begins with defining a person's societal roles, character centers, goals, and priorities. A comprehensive view of the external and internal environments will provide us an opportunity to move on to strategies and scenarios.

Analysis of the internal and external environments of the workplace is the next stage of the strategy.

IV. THE WHEEL OF LIFE BALANCE

The Wheel of Life Balance is a visual tool that helps a person quickly understand the level of satisfaction with their lives, their level of balance, and the distance to the ideal.

The Wheel of Life Balance was first described by Paul Meyer [15], who called this approach the concept of becoming a "Total Person". Paul Meyer emphasizes that change is a process that involves planning, learning, goal setting, and practical implementation of these goals. Each person is a complex and unique individual who has many roles to play in life. The concept of a "Total Person" is more than an approach; it is an action-oriented lifestyle that focuses on the setting of goals and formation of action plans that focus on six vital areas (Figure 1): Home and Family, Finances and Career, Mind and Education, Physical Health, Society and Culture, and Spirituality and Ethics. This concept focuses on an individual action plan that uses self-assessment to help people identify personal values as well as set priorities and create goals. These actions allow anyone to achieve balance in all six areas of life.

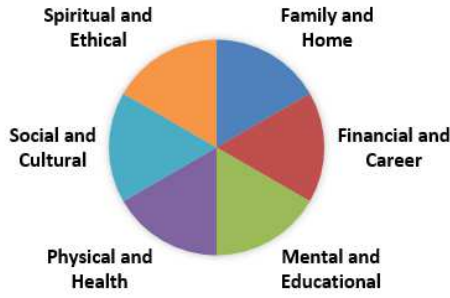


Fig 1: The Wheel of Life Balance according to Paul Meyer

Using the Wheel of Life Balance in the information technology for time management will allow determine the vector of user development. In order to work with the Wheel of Life Balance the user creates their own set of categories (from 4 to 8), or can begin working with the existing set presented above.

When the user chooses the option of “assembling” their own wheel, there is a problem with the complexity of implementing the mechanism of setting the user’s own goal due to its level of abstractness. The Wheel of Life Balance in this context serves as a template of values. To solve this problem, we use the following techniques:

1. The user is given a list [16] (Table 1) from which to choose 4 to 8 key values of his life, thus indicating the priorities or directions of movement. In order to be able to replenish the proposed list in case it is found to be insufficient, a mechanism for hinting at one’s own unique values has been implemented.

2. A table is formed correlating the life-values and hypothetical purposes where criteria of the values are specified on a ten-point scale (Table 2). The resulting table shows goals which make the greatest contribution to the overarching goal.

After selecting the categories, the user should think and evaluate on a 10-point scale their current attitude towards each value. Consider a user rating the “health” category. If he eats well, does not smokes, rarely gets sick, but wants to find the time and courage to learn to swim, he might give himself a grade of ‘7’. The goal is to gradually improve upon the categories that are rated the lowest, so the circle becomes equalized (meaning categories are balanced). Once this is achieved, all categories can be simultaneously ‘pulled’ to a score of 10 (Fig. 3). In this case, a fitting analogy is that of a car wheel, which is first placed and leveled out before being inflated. If the estimates do not increase once the categories are balanced, the user has problems with self-esteem and satisfaction, which is important to pay attention to.

Let the set of Wheel of Life Balance categories be $B = \{B_i\}$, $i = \overline{1, n}$, where n – where n is the number of categories. Then the level of self-dissatisfaction can be measured as:

$$B = \sum_{i=0}^{i+1} (10 - B_i) \rightarrow \text{mln.}$$

TABLE I. LIST OF KEY VALUES

Personal Quality	Personal Quality	Value
Firm Will	Sense of Humor	Satisfaction
Purposefulness	Spirituality	Entertainment
Being principled	Optimism	Children
Directness	Altruism	Love
Sincerity	Respect for others	Family
Sacrifice	Faith in God	Athletics
Tolerance	Wit	Artistic Interests
Wisdom	Lenience	Hobbies and Leisure
Kindness	Understanding people	Finances
Generosity	Practicality	Communication
Honesty	Relaxation	Productivity
Sportsmanship	Integrity	Comfort at Home
Courage	Open-mindedness	Professionalism
Joy	Compassion	
Tact	Self-control	
Patriotism	Good Mood	

TABLE II. EXAMPLE OF GOALS AND VALUES CORRELATION

Goal	Value						Conclusions
	Kindness	Calmness	Family	Love	Hobby	Professionalism	
Go shopping with spouse	4	2	7	4	0	0	17
Communicate with subordinates about project	3	2	0	0	2	7	14
Monitor health	5	6	5	3	2	4	25

V. FEATURES OF THE APPLYING OF BALANCE CATEGORIES

The process of drawing up a plan for ‘pull’ the estimates of categories is important. For example, a monthly goal may be ‘pull’ the category with the lowest estimate to the estimate of the category second from the bottom of the list. Specific deadlines will help to see the goal more clearly and achieve it more effectively.

The values assigned to categories is not constant, they constantly change along with life. Thus, it is important to monitor and re-assess these values to ensure they are being guided to growth. Viewing the Wheel of Life Balance as a histogram makes it easier to observe the process of changing attitudes to specific categories. As an example, consider the “Health” category, in which the user planned to radically change within six months, but was hindered by changes to their body due to the holidays. After the holidays, he began practicing yoga and swimming. This process should be recorded to allow prediction of similar future changes (Fig. 2).

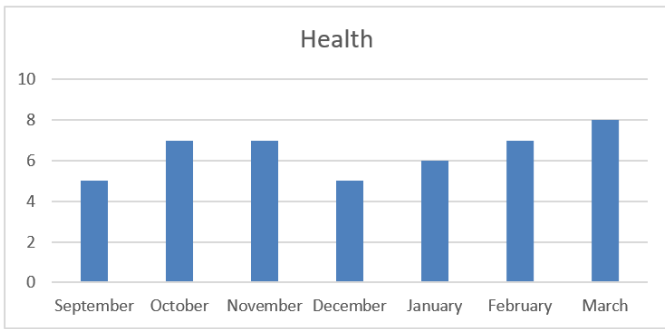


Fig. 2. The dynamics of change in the value of Health

Laziness and procrastination as well as uncertainty and fears are constantly present in our lives and have a constant impact on us. Therefore, it is proposed to consider them on par with other components of the Wheel of Life Balance, but with an opposite effect. That is, the goal for these categories is a declining value of importance. If all categories are balanced, but the user constantly postpones a large number of cases, then the overall efficiency of the wheel will be low and the idea of success becomes an illusion. Similar processes are possible with uncertainty and fears. For example, a student who has graduated from university not being ready to change their lifestyle. The impact of additional categories is shown in Fig. 3.

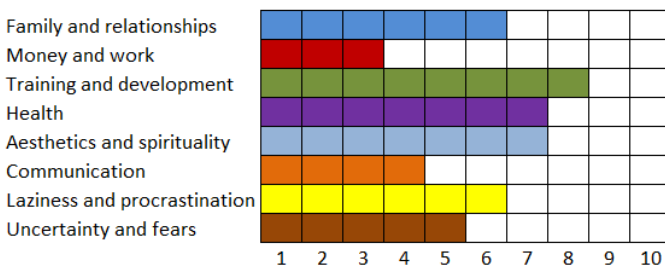


Fig. 3. The impact of laziness, procrastination, uncertainty, and fear on the balance of life

Each task from the user's calendar will be marked with a hashtag [17] to its corresponding category from the personal Wheel of Life Balance. If a task cannot be labeled and no categories fit, it means the task does not fit the global goal and it will be recommended to remove the task from the calendar.

However, the opposite situation is also possible: when two hashtags correspond to one event at once. For example, a family trip to the water park may fall under the category of "Health", "Entertainment", and "Relationships" at once. Therefore, a mechanism for combining categories has been developed.

The possibility of dividing the category into "active" and "passive" phases has been added to information technology. For example, having a party with senior colleagues or experts can help you make friends or strengthen your relationships. The "Leisure" and "Communication" categories would place into the passive phase, and "Learning" and "Development" into active phase.

As noted above, the external categories of achieving success play an extraordinary role. They are extremely difficult or impossible to manage, but their impact is important consider all the same. Therefore, it is proposed to match each major event with an external category that affects its performance. The information technology automatically suggests possible external categories, and the user must turn them on or off. For different tasks may be suitable at the same time several external categories, an example of which is given in Fig. 6. Taking external categories and their effects into account will help to better prepare for events and look at internal factors from an alternative perspective.

Taking into account a combination of external and internal factors will reduce the occurrence of unexpected troubles or pitfalls and provide an opportunity to predict vulnerabilities. This assists with build of strategy and considerations of risks.

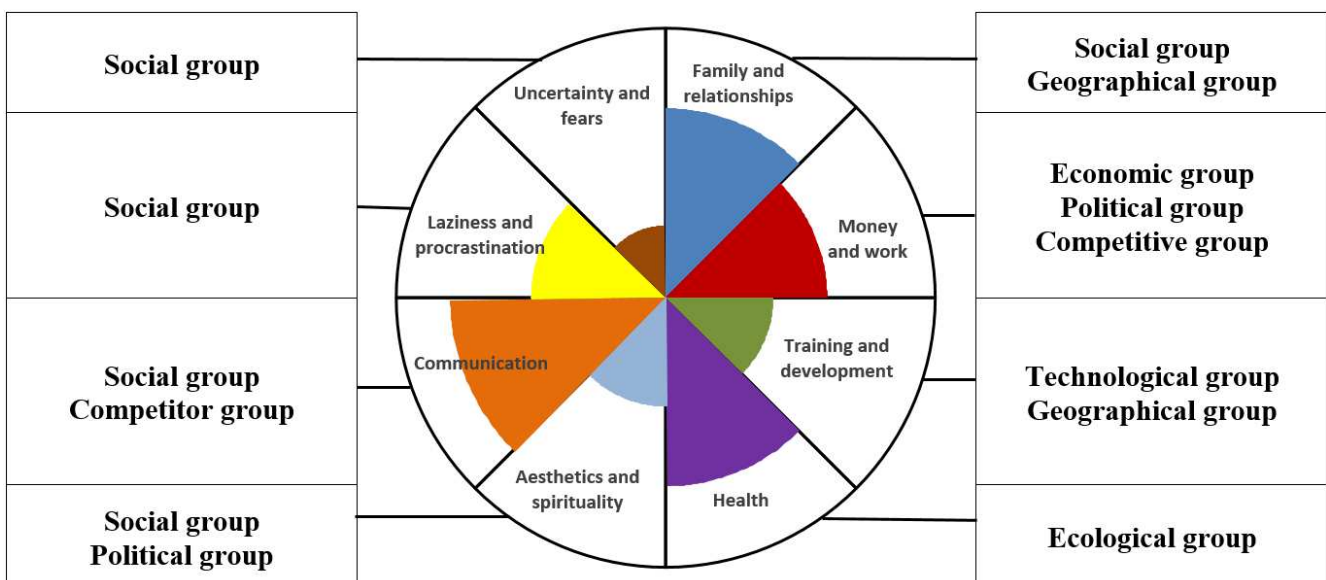


Fig. 4. An example of the impact of external risks on the balance of life

VI. FUNCTIONAL MODELLING OF THE “WHEEL OF LIFE BALANCE” SOFTWARE MODULE

The life of a modern human is a constant process of moving from goal to goal, and the development of time-management information technology takes this cyclicity and continuity into account. The main purpose of this information technology is to provide individual recommendations for achieving global goals, for which a mechanism has been developed allowing the user at any stage of planning to return to the Wheel of Life Balance to change its components. If the user chooses to do so, they will be warned that some recommendations and statistical information will be lost. For example, hashtags at events, dynamics of changing categories and the level of satisfaction will be zero.

Visualization at each step of the process dynamically prompts the user to assist with planning, as well as displaying help information, reports, and statistics in separate windows. Visualization of global events is achieved in the form of context, lists and charts.

Local events are visualized using a Tetris-like scheme where each figure corresponds to a Wheel of Life Balance category and the blanks reflect the level of uncertainty, downtime, laziness, or procrastination.

Figure 5 shows the class diagram of the developed module. This module is a component of integrated time management information technology. The information technology uses a star topology to interact with modules to ensure reliability and speed. In the software module “Wheel_balance_life” the main class is “wheel_balance_life”. It performs all calculations and generates results. Unfortunately, this overloads it with methods, but it makes all work done by the software transparent.

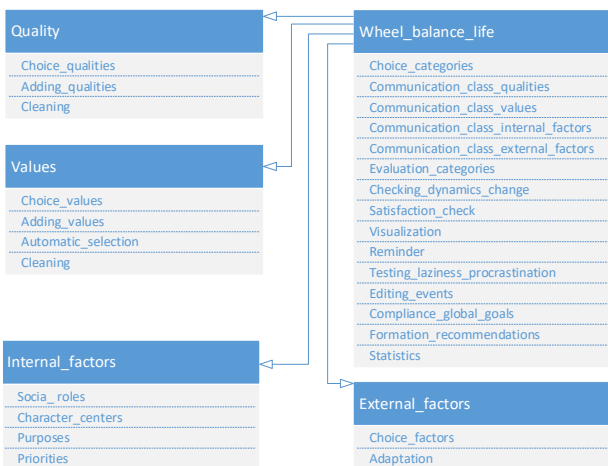


Fig. 5. Class module diagram

Figure 6 shows a diagram of the Wheel of Life Balance module which allows presenting of the sequence of actions and parallel processes. This made it easy to distinguish 4 stages: working with the template, monitoring global events, determining schedules and terms of changing categories so as verification and control of results. There are intermediate steps between each stage in the form of information help

visualization blocks, and blocks that take external influences into account. The process of the user’s work with the module is regular therefore a mechanism has been implemented to remind the user of the need to monitor changes.

The classes “Quality”, “Values”, “Internal_factors”, and “External_factors” are ancillary and provide data collection and structuring. Other software components, such as the application menu class, or the context-sensitive event planning class, can be used by users to access auxiliary classes providing convenient logistics for using the application.

VII. EXPERIMENTAL RESULTS

Table 2 (see section 3) shows the results of the correlation of goals and values, which indicate the criteria of values on a ten-point scale. The results of the work show which of the goals make the greatest contribution to achievement the global goal. Some of the balance sheet module work results are shown

in Table 3 which show part of the weekday personal and work events of the marketing company manager. The total number of hours spent by the user to perform the described events is 11.8. The external factors influencing these events are dominated by the social group - SG and economic group – MG. It follows that before the sevents the user will be given advice on these areas. Among the above events, events from the categories "Work" predominate, the next step is to the categories "Work" predominate. The next step is to compare the categories to ensure balance.

There are a large number of recurring events, namely recurring events every day, every working day, and so on. This information will be transmitted to the forecasting module, which will predict workload and events. It has been determined that 3 out of 8 events do not meet global goals. If they are canceled, time reserves will be created, forces and resources will be saved. The average success rate is quite low - 68%, and the highest results in events - do not meet global goals, which indicates a distraction and therefore a loss of efficiency. The indicator of the number of transferred events affects the category of procrastination. If its level is significant, then motivating recommendations and ways to increase efficiency will be provided. There may be cases of postponement of events in case of overload, when the day is oversaturated with events. In which case it is necessary to adjust the plan and abandon some events. One of the most important parameters is the dynamics of category change. This indicator indicates the effectiveness of the movement to establish balance. In Table 3, for some events, this parameter is empty because information technology has recommended that events be canceled. The total effectiveness of the dynamics of category change is -2%, which indicates a loss of efficiency and the need to check the schedules. The level of user satisfaction for the week increased by 5.5%, which indicates high morale and good motivation. This allow will increase efficiency and effectiveness when performing the next events.

The characteristics listed in table 3 are to be determined by the user independently. When creating events, the default parameters are the name of the event, date, time, duration,

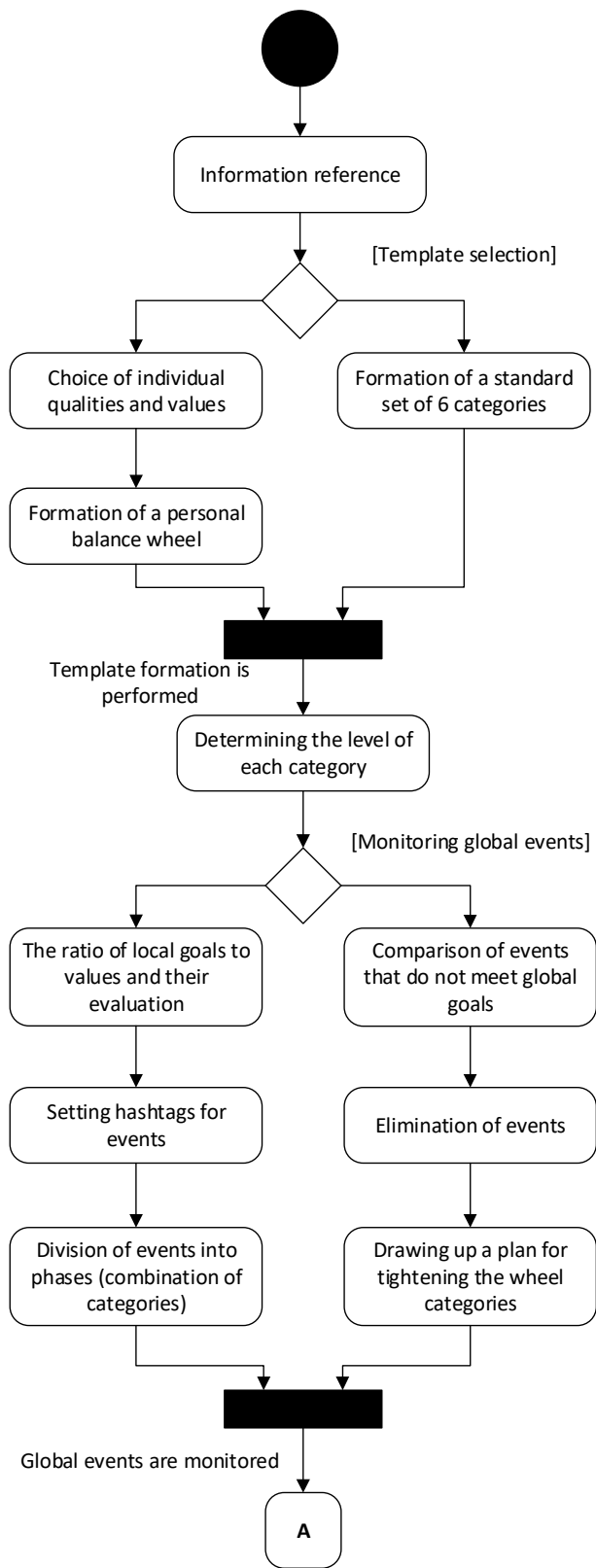


Fig. 6. Activity Diagram for the “Wheel of Life” module

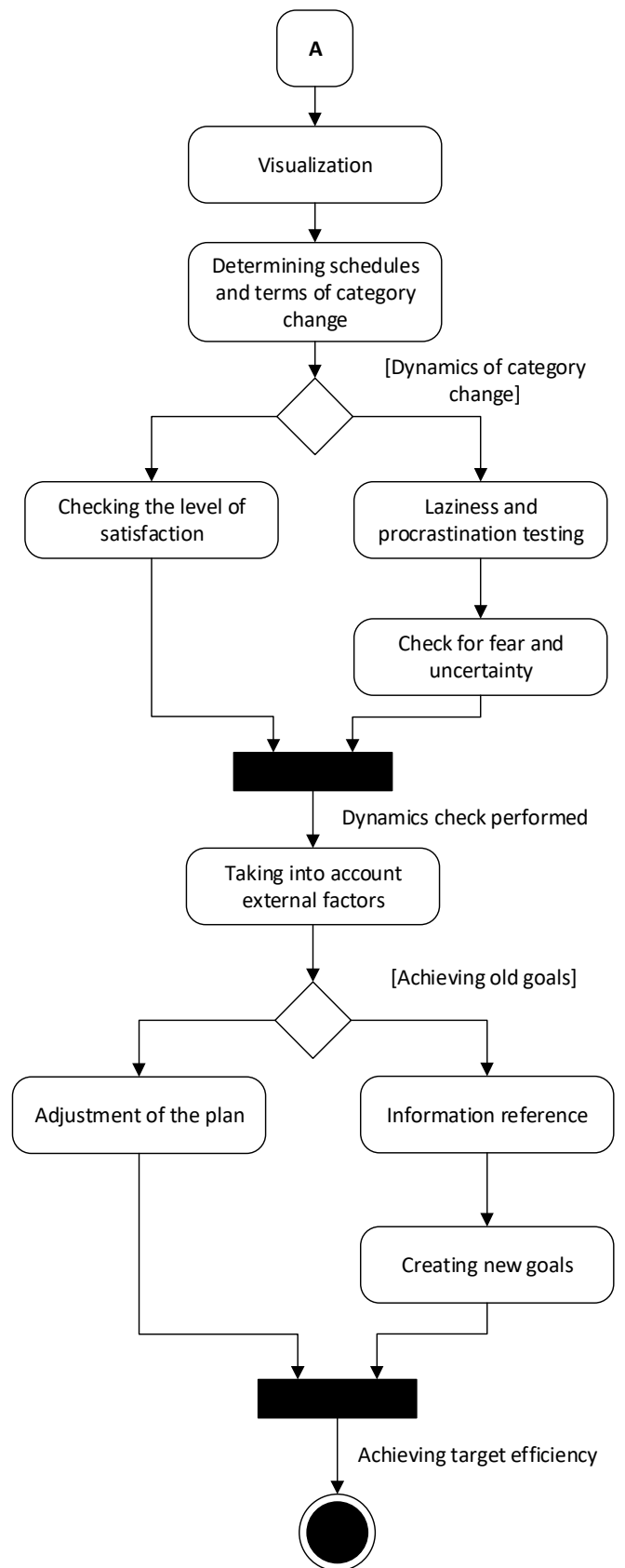


Fig. 6. (continuation) Activity Diagram for the “Wheel of Life” module

and so on. Then, with the help of Check boxes, the user selects external factors, categories, compliance with global goals, and recommendations for preparation for it taking into account the context of events and the external factors. After execution the event or at the end of the day the system asks the user to make estimates the events, their own moral and psychological condition. According to these estimates, the dynamics and movement to the goal is determined.

During the experimental studies, 112 people in 5 groups used the developed information technologies for 4 weeks to plan daily schedules and make plans. These groups consisted of participants in trainings on time management and labor organizations; leading specialists of the energy companies; leading specialists in the field of marketing. The developed system allowed to increase the overall success of tasks due to the better structured schedules and greater motivation. Due to the use of the software application, the average success rate of events changed from 63% to 84%. Due to the provision of recommendations for considering external factors, the number of postponed events or rejected events decreased by 23%. The placement of hashtags allowed to divide events into categories and thus improve the contextual planning and forecasting of events. The accuracy of the recommendations increased from 67% to 81%. Tracking the dynamics of change of categories allowed us to track the movement towards the global goal and reduce the time to achieve it. 76% of the surveyed users of the service said that the goals set for 5 years may be met in 3 years. The level of self-satisfaction during the use of the software application among users increased from 55% to 71%.

The above research results were obtained with the help of sociological surveys (a separate module in the software application) and with the help of experts in the field of psychology, management, personnel training and process automation.

An example of the implementation of the quality and values selection process in Information Technology is presented in Fig. 7 and Fig. 8. The first figure is a screenshot of the software application through which the process of selecting key user qualities is shown. In the example from the proposed list, the user has selected 7 important personal qualities that they want to develop (the selected qualities change color from black to purple).

If a quality the user finds to be important is not in the list, it can be added manually using "Add on option" button. "Clean up" button is responsible for clearing the selected qualities, and "Save" button saves the changes. The second figure show a similar process, but with values. Namely, the example shows how the user chose 8 values that he wants to develop. It is also possible to specify your own categories via "Add on option" button. If the user has doubts, they can press "Auto selection" button and an automatic selection will be made based on the qualities and popular categories of people in his social status.

The middle two buttons are responsible for storing and clearing data from the database. The pie chart shows the current status of each selected category, and the button at the bottom right allows you to change values, distribute loads, view dynamics, and more.



Fig 7. Selection of qualities to be developed in the time planning software

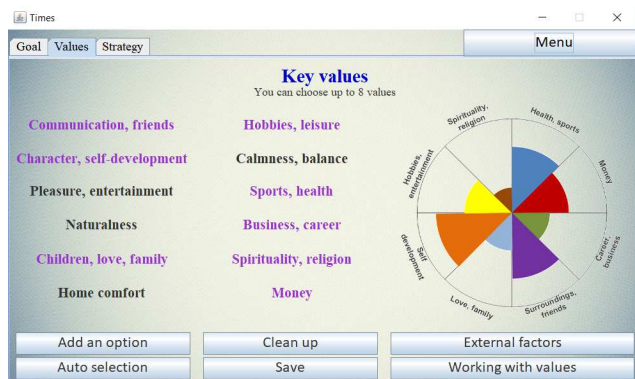


Fig 8. Example of the choice of qualities and choice of values in the time management software

VIII. LIMITATIONS AND FUTURE RESEARCH

The study involved employed people aged 23 to 62. Participation was voluntary and not encouraged in any way, the participants were mostly from densely populated cities and with higher education, so the results of the study cannot be generalized to the whole population. This is a limitation of the study. Expanding the sample will improve the results in the future. The research does not take into account the material and financial support of users. Expanding research in these areas will provide more accurate recommendations with resource deduction. Economical use of resources is the guarantee of the effective and efficient work.

IX. CONCLUSIONS

In this work first time the addition of the to achievement of personal success through analysis of local events from the point of view of the vector of achievement of global goals, that are oriented on personal values. This approach allows to “sift” through many irrelevant local events that do not lead to achievement of success. Time management requires the ability to take responsibility for one’s life and to respond accordingly to life changes. The end goal is a balanced life in which one has enough time for work, relationships, rest and happiness.

The addition of the monitoring process for the levels of dissatisfaction, “laziness and procrastination” and “fears and uncertainty” was suggested to be added to the wheel of life

balance. This allowed to raise the effectiveness of the suggestions given by the technology, to raise the motivation level or the user and to prevent the burnout.

TABLE III. AN EXAMPLE OF THE FORMATION OF THE RESULTS OF THE BALANCE SHEET MODULE

Event	Length per day, ^{hours}	External influences	Category	Repetition, times per week	Success rate, %	Postponing	Correlation with global goals	Change dynamic per week, %	Satisfaction rate per week, %
Monitoring world news	2	SG MG PG	Entertainment	7	90	-	-		-2
Studying the trends of cleaning supplies market	0,5	SG MG KG	Work Study	2	70	+	+	0	1,5
Completion of video game	2	SG TG	Entertainment	4	75	-	-		0
Study of neuroeconomics	0,5	SG MG TG	Work	2	60	+	+	0	2
Weekly meeting with lower ranking colleagues	0,8	SG MG	Work Social	2	80	-	-		0
Raising brand rating	1	SG MG KG	Work	3	70	-	+	1,5	3
Communicating with ad companies	2	SG MG TG KG	Work	5	40	-	+	-3	0,5
Studying the competition	3	SG MG TG KG	Work Study	5	60	-	+	0,5	0,5
...									
Conclusions	11,8	SG MG	Work	+	68	2	5 of 8	-2	5,5

The use of a wheel in a wheel as a tool for visualizing the balance of life, namely combination of taking into account external and internal factors of life, is proposed. This will reduce risks, increase the efficiency of the forecasting process, create a basis for strategy. Research has also shown that it has reduced the number of postponed or rejected events by 23%. This differs from existing approaches that do not take into account the target direction, integrated view of the environment. Success lies in an effective and efficient combination of external and internal categories.

The reliability and adequacy of the developed module is proved by the results of testing the software implementation of information technology (total dynamics of change of categories -2%; satisfaction level 5.5%; current success of performing the problems 68%; compliance with the global goals 5 out of 8; factors of the external influence SG and MG).

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