Recommendation System to Improve Time Management for People in Education Environments

Samaher Al-Janabi, Mahdi Abed Salman and Ahmed Fanfakh
Department of Computer Science, Faculty of Science for Women (SCIW),
University of Babylon, Babylon, Iraq

Abstract: The subject of time management is important and useful in different fields of our life and society as a whole. It is considered as an invaluable factor if utilized correctly. This study aims to design a Time Management Recommendation System (TMRS) for Educational Environment (EE) to provide their students, employees and academic staff an effective way to exploit their time. We will build a system consist of 6 steps: set a questionnaire, it consists of 50 questions. These questions explain how each person deals with the time, distribute the questionnaire among target categories (student, academic staff and employees) in EE using a web link and collect their responses in real time, pre-processing target categories responses by transforming from them from descriptive to digital answer to help deal with these data that will be used to build the fitted model and the most important questions were determined in this phase. Design suitable model for all the 800 response samples used in testing for the all three group of people in EE in this step, design model shows the relationship between the response of academic staff and employees, other model show the relationship between the response of academic staff and students, final model show the fitted model among the response of academic staff employees and students. The TMRS Model performance was evaluated using two types of statistical measures and each one has 5 measures. By another words, the model accuracy will be tested using ten measures, these measures include five measures generated by a confusion matrix, namely: Accuracy (AC), recall or True Positive rate (TP), Precision (P), F-measure and (considers both precision and recall) and Fb. In addition, five error measures, namely: Maximum Error (ME, Root Mean Squared Error (RMSE), Mean Squared Error (MSE), Mean Absolute Error (MAE) and Mean Absolute Percentage Error (MAPE). Finally, generate different recommendations compactable with the fitted model, these recommendations split into four groups. The findings and analysis of this research can provide a way for the target categories to gather useful information about probable trouble areas, possible areas for development and what to do to manage, use, plan, exploit and get the maximum value from their time.

Key words: Human behavior analysis, recommendation, sequence of occurrences, time management, education environment, MAE

INTRODUCTION

A few centuries ago, scholars observed that the time in a day is specific and fixed for everybody in Educational Environment EE. They also, realized that time was moving forward sequentially that is, under a particular system, could not be stopped, changed increased or even gone backwards (Akomolafe, 2005). Furthermore, they noticed that time represents one of the most important resources that were both rare and precious to any human being in his/her life. However, even when the time is specified as 24 h/day to all human beings, sometimes, it seems that there is not enough time to whatever want to do (Timilehin and Adenike, 2013). Therefore, we have to invest our time to accomplish all our goals.

Proper time management is concerned with the effective use of time at any type of research (Grissom et al., 2015). For instance, advanced societies pay more attention and care to the subject of proper time management through a proper time distribution skill to ensure that their objectives are achieved. By contrast, less attention, diligence and care to time may be the main cause for the slow developing of other societies. Time management requires essential skills such as planning, regulation, prioritization and control for accomplishing the desired goals. It can also, play a significant role in progressing of societies (Cetin et al., 2016). The official working hours are important to complete the required research because employees have a fixed number of working hours to do their daily duties (Sharma and Nayak,

Corresponding Author: Samaher Al-Janabi, Department of Computer Science, Faculty of Science for Women (SCIW),
University of Babylon, Babylon, Iraq

Fig. 1 : Effective time management factor

2016). Proper time management involves the effective use of the available time to complete the assigned research and also can play a prime role in avoiding work stress in our life (Hurtienne *et al.*, 2014; Moreno *et al.*, 2016).

According to Lakein and Leake, the fundamental factors of time were classified into three categories: effectiveness, efficiency and effortlessness. The effectiveness is methods that used to achieve the desired goals. The efficiency refers to lowest cost of losing time to achieve those goals. The effortlessness means accomplishing the desired goals comfortably instead of feeling psychological or physical stress when dealing with time. Figure 1 shows the required essential components for an effective time management.

Time management can be defined as the art of managing work and personal affairs by somehow to accomplish the desired goals over a dedicated timeframe on a specific task to increase the productivity and efficiency (Macan *et al.*, 1990). For example, students have to manage their time within the effective regulation inside and outside the university such as organizing their lecture's time, attending conferences, seminars as well as participating in the university activities which require from them to effectively manage their time. Recently, several studies have shown that time management can play a vital role in enhancing academic performance for students (Hamzah *et al.*, 2014; Grave, 2011; Aduke, 2015; Nadinloyi *et al.*, 2013; Crawford and Wang, 2016) and it has a direct influence on their academic outcomes (Talib and Sansgiry, 2012; Wong and Tee, 2016; Swart *et al.*, 2010). On the other side, wasting time represents the biggest challenge faces time management such as lacking of clear objectives or plans to be achieved in completing the required research leads to poor academic achievements (Ruiz-Gallardo *et al.*, 2016; McCuen, 1996). Students learning outcomes will not only be affected and slipped by a poor time management but also their academic future will be in danger (Scott and Saaiman, 2016). In th this context, students should take into their account the wasted time and design a plan to exploit and manage their time fairly. In addition, they should balance between the desired goals and their duties to overcome that obstacle.

Research aim and objective: In spite of the time is the most important resource in our lives, many persons manage their time badly and end up to waste so much of time. In fact, they rarely set a plan to their daily activities. As a result, it always seems that there is not enough time to achieve all their objectives and goals. Consequentially, it could lead to accumulate stress in our lives.

Proper time management can assist in achieving good results as planned and leave us extra time for reading, attending important courses as well as time for social activities. On the other side, poor time management within EE leads to a variety of negative consequences such as missing of deadlines to finish the required assignments, projects and demands, failing to keep a track of the schedule, less productive than others.

Therefore, there is a need for focusing primarily on time management in EE. For this aim, a Time Management Recommendation System (TMRS) is designed to enable target categories: students, academic staff and employees to exploit their time and apply quality criteria in their research in an effective way. From the results of analysis, a set of vital recommendations for each category will be generated by the proposed system. By following these recommendations, each target category can be able to manage, use as well as exploit their time effectively. In addition, it will increase the interaction between them within the EE as well efficiently. To our knowledge this is the first research in which TMRS has been applied to enable students, academic staff and employees better manage their time in the EE.

General concepts of time management and limitations: The success of the administrative or functional process of both public and private organizations depends on a number of factors. These are the physical and the human factors. The human factor refers to the personnel, among them, employees, supervision, agents or managers, heads of departments, employee's executive's scribes, technicians and craftsmen. The physical factor, e.g., the official working time is an important factor for completion the work because employees have a fixed number of working hours within which to do their duties. Employees who fail to complete their assigned tasks within the given working hours are usually punished for breach of duty.

Most countries require employees to research for only 8 h. However, employees usually work for a lot less time than this depending on the efficiency and the power of the administration to supervise. The number of actual working hours also depends on the employee's level of preparation, especially when doing technical work. Since, time is scarce, every organization must ensure that its employees make effective use of their time in order to achieve the objectives of the organization.

Proper time management involves effective use of the available time, since, we cannot increase the number of working hours. For example, suppose one spends 10 min on his way to work and 20 min a day from work to home. Further assume that each week has 6 working days. This means that one wastes 120 min/week in transportation or about 106 h every year.

Time categories: There are two types of time when dealing with day hours: the first category is the time that we cannot re-manage, reorganize or use it for different activates. This includes the time we spend in sleeping, eating and engaging in social relationships. One should schedule this time and their productive. The second category is made up of time that we can manage and sort out. This is the time designed for work and private life. One should design a proper strategy to manage this time to get optimal benefit from it. Manageable time is divided into two subcategories: peak time and idle time. Peak time refers to the time that we able to obtain maximum activity and concentration. Idle time, on the other hand is the time when we experience reduced luggage of mental focus. So, to manage our time effectively, we must first identify the time that we are at fully active and when we are idle to take advantage, so that, we can maximize our output (Fig. 2).

Research methodology: Algorithm 1 illustrates the details of the study workflow which consists of 6 main steps: preparing the questions, data collection, preprocessing, handling the answers based on matching model, behaviors analysis and recommendations generation.

Data were collected from 940 participants and they are divided into three main categories: students, employees and academic staff within the environment of higher education located in the Middle East. The reason why these individual's groups were chosen is because they use time management as a part of their day-to-day events and also in different aspects of their life. Moreover, it is also, worthy to have a closer look at how these groups use, manage and exploit their time in the educational environment. A total of 800 questionnaires were completed which were then used for subsequent data analysis and assessment.
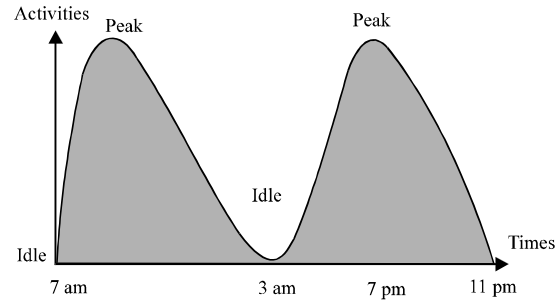

Fig. 2 : The distribution of activity along the day

Preparing set of questions: The questionnaire consists of 50 questions* and their answers limited to "No", "Yes" and "sometimes". The estimated time for the participants to complete the questionnaire was about 15 min. Appendix a provides the complete questionnaire.

Data collection: In order to obtain the way the target participants exploit and manage their time, the data was collected through a questionnaire as a main measure with the purpose of collecting data, since, it represents inexpensive manner to collect data from a large group of participants.

Preprocessing: These responses are automatically transformed into 0, 1 and 2, respectively by the program where 0 means "No", 1 refers "Yes" and 2 means "sometimes". The optimal answers for the questionnaire are stored in the system to be later used and compared with the participant's responses and then generate the ratio of matching. The data analysis begins when the target participants involved for answering the questionnaire and store their responses in a database.

Handling the answers based on matching model: To offer a more elaborate image about how the time is used by the target participants and to better understand and analyze their responses, a mathematical model was built where its aims to compare the target categories answers with the optimal answers of the 50 questions were used in the questionnaire and generate the recommendations. In this research, Gaussian Mixture Model (GMM) is used. GMM is the weighted sum of M component Gaussian densities. GMM is often used in biometric systems due to its ability to represent large class of sample distributions. In addition, it has a promising capability to form smooth approximations to arbitrarily shaped densities (Reynolds *et al.*, 1990). Figure 3 illustrates the pseudo code for GMM Model.

- Questionnaire in English language
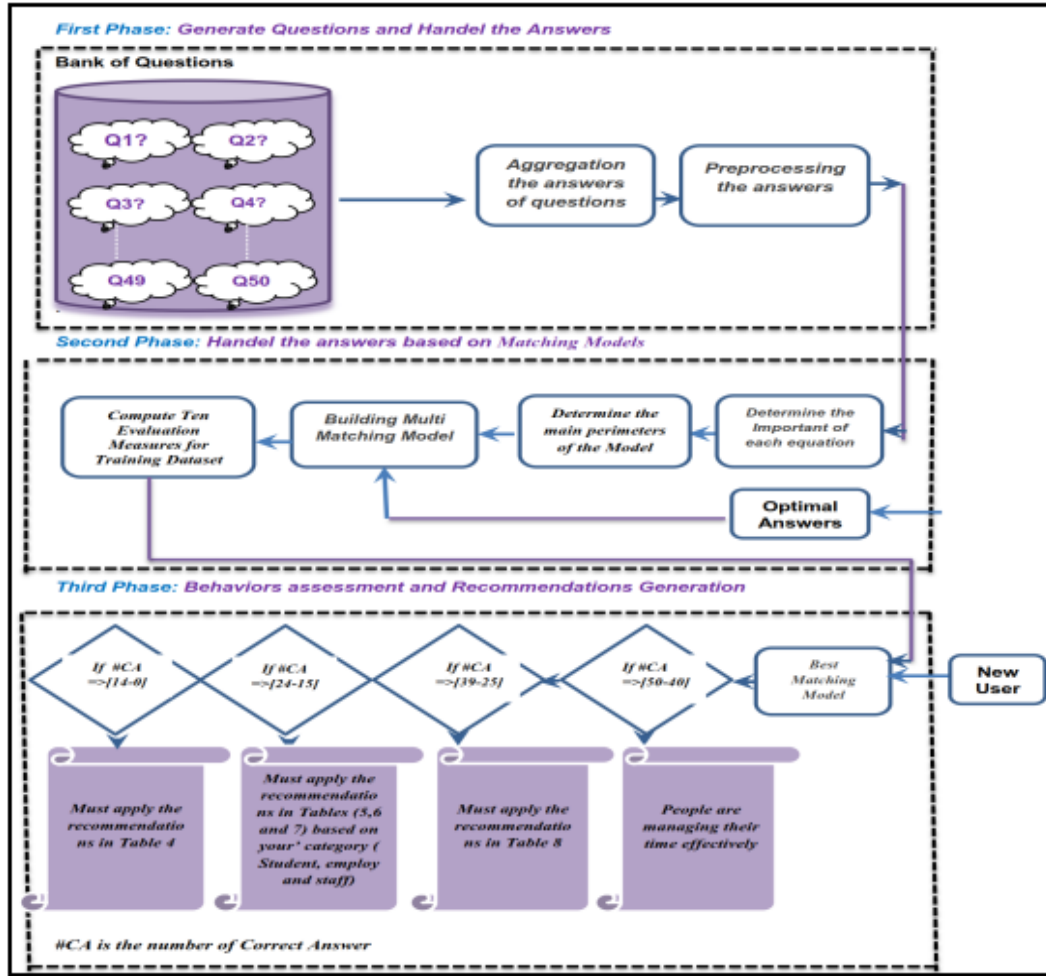- Questionnaire in Arabic language

Fig. 3: Block diagram of recommandation system

Algorithm 1; Pseudo code of GMM Model:
Input: Collected Response of People in EE
Output: Fit Model and Recommendations

Step 1: Determine the mixture elements (i.e., weights, mean vectors, covariance matrices), we can show by the following mathematical expression:

$$f(x \mid y) = \sum_{i=1}^{M_c} w.f(z \mid M_i, \sum_i)$$

Step 2: A numerical parameters of Gaussian mixture model elements can be find using the expectation-maximization algorithm. This algorithm done recursively and result:

$$w_j^{i+1} = \frac{i}{N} \sum_{i=1}^{N} f(j \mid z_i, \gamma)$$

$$m_j^{i+1} = \frac{\sum_{i=1}^{N} z_i f(j \mid z_i, \gamma)}{\sum_{i=1}^{N} f(j \mid z_i, \gamma)}$$

$$\sum_j^{i+1} = \frac{\sum_{i=1}^{N} f(j \mid z_i, \gamma)(z_i - M_j^{i+1})(z_i - M_j^{i+1})^T}{\sum_{i=1}^{N} f(j \mid z_i, \gamma)}$$

where, N is the number of data samples:

$$f(j \mid z_i, \gamma) = \frac{w_j^i f(z_i \mid M_j^i, \sum_j^i)}{\sum_{K=1}^{M} w_K^i f(z_i \mid M_j^i, \sum_j^i)} = \frac{w_j^i N(M_j^i, \sum_j^i)(z)}{\sum_{K=1}^{M} w_K^i N(M_j^i, \sum_j^i)(z)}$$

Let $\{w_i^*, \mu_j^*, \sum_j^*\}_{i=1}^{M_c}$ denote to the point of convergence.

Step 3: Shrink the matrix by Perform mixture reduction through show the distance measure as:

$$D_B = \frac{w_p w_j}{w_p + w_j}(M_P - M_j)^T \sum_P^{-1}(M_P - M_j)$$

Step 4: mathematical form of merged components that equivalent mean and covariance explained as:

$$w_m = \sum_{j \in I} w_j$$

$$M_m = \frac{1}{w_m} \sum_{j \in I} w_j M_j$$

$$\sum_m = \frac{1}{w_m} \sum_{j \in I} w_j \left[\sum_i + (M_j - M_m)(M_j - M_m)^T \right]$$

End

Evaluation: The TMRS Model performance was evaluated using two types of statistical measures and each one has five measures. By another words, the model accuracy will be tested using ten measures, these measures include five measures generated by a confusion matrix, namely: Accuracy (AC), recall or True Positive rate (TP), Precision (P), F-measure and (considers both precision and recall) and Fb. In addition, five error measures, namely: Maximum Error (ME, Root Mean Squared Error (RMSE), Mean Squared Error (MSE), Mean Absolute Error (MAE) and Mean Absolute Percentage Error (MAPE). In results study, we will explain all the values of these measures related of TMRS.

Behaviors assessment and recommendations generation: Based on the ratio of matching which was generated from the previous phase, some recommendations will be provided as solutions for every targeted category used in this research. These ratios are divided into 4 groups as follows: if the answers match up (0-14) with the correct answers. This means the person has a wasted time and he/she cannot manage their time properly. The proposed time management system will offer 15 reviews and recommendations for this case.

When the participant's answers match (15-24), the person has a noticeable loss of time and the proposed time management system will present 21 recommendations in the case of the participant is student while 19 advices will be provided for employees and 13 recommendations

for academic staff. However, if the ratio of the match is (25-39), the person has lost small amount of time and the proposed time management system will suggest 24 recommendations that could help improve the management of his time. If the participant's answers match the extent of (40-50) with the optimal answers, then it means the person exploited the time well. Finally, it is important and useful to regularly implement these recommendations by each person for a period of time that not >30 days to get the maximum benefit from the proposed a time management system.

RESULTS AND DISCUSSION

Respondent's answers to each question along with their importance are provide in and Fig. 4 and Table 1.

Results of GMM: Based on the responses obtained from the target categories and after identifying the important questions, 3 models were built based on the Gaussian matrix to identify the association between the target groups. The first model provides correlation between the responses of students and academic staff as shown in Fig. 5 while the second model explains relationship between academic staff and employees in the EE as shown in Fig. 6. The third model shows the optimal relationship among students, academic staff and employees as shown in Fig. 7.

Figure 8 describes the variance which represents the relationship between the actual target categories and the expected responses.

Model performance evaluation: To assess the GMM performance, two types of statistical measures were used which also helped validate the GMM Model. These
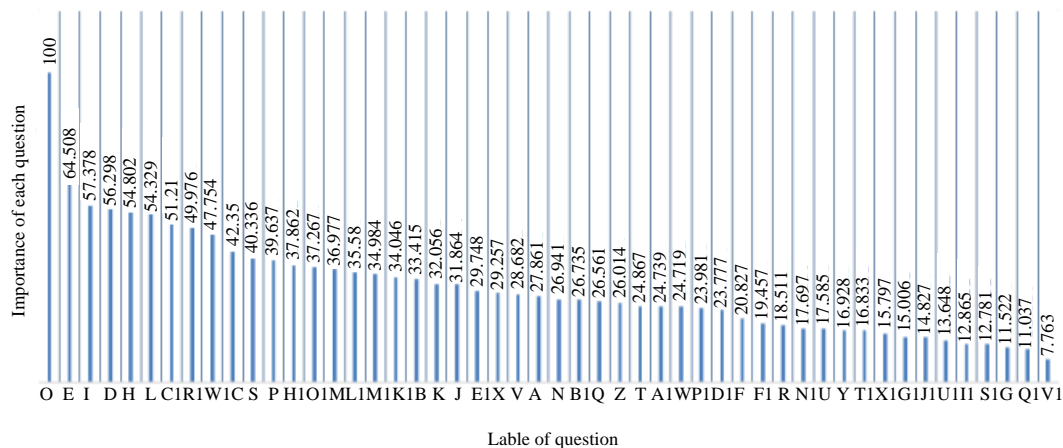

Fig. 4: Important of each question in the questionnaire

Table 1: Important of each question

Questions	Importance
O	100.000
E	64.508
I	57.378
D	56.298
H	54.802
L	54.329
C1	51.210
R1	49.976
W1	47.754
C	42.350
S	40.336
P	39.637
H1	37.862
O1	37.267
M	36.977
L1	35.580
M1	34.984
K1	34.046
B	33.415
K	32.056
J	31.864
E1	29.748
X	29.257
V	28.682
A	27.861
N	26.941
B1	26.735
Q	26.561
Z	26.014
T	24.867
A1	24.739
W	24.719
P1	23.981
D1	23.777
F	20.827
F1	19.457
R	18.511
N1	17.697
U	17.585
Y	16.928
T1	16.833
X1	15.797
G1	15.006
J1	14.827
U1	13.648
I1	12.865
S1	12.781
G	11.522
Q1	11.037
V1	7.763

Table 2: GMM Model evaluation based on error measures

Error Measures	Values
Maximum error	0.2769300
Root Mean Squared Error (RMSE)	0.6125859
Mean Squared Error (MSE)	0.3752615
Mean Absolute Error (MAE)	0.4889608
Mean Absolute Percentage Error (MAPE)	24.6386850

Table 3: GMM Model evaluation based on confusion matrix measures

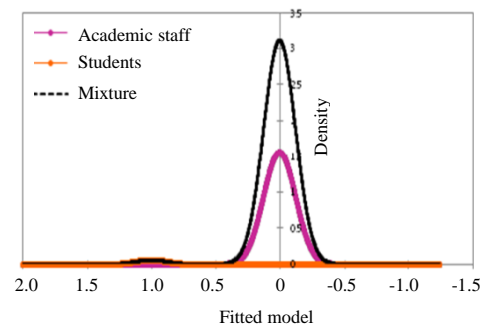| Confusion matrix measures	Values (%)
Accuracy	90.01
True Positive (TP)	87.00
Precision	93.00
Recall	84.81
F-measure	95.23

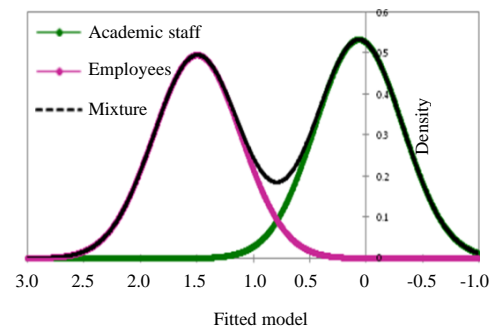Fig. 5: Relationship of responses between academic staff and students

Fig. 6: Relationship of responses between academic staff and employees
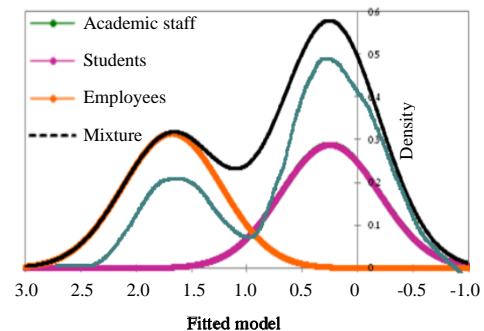
Fig. 7: Relationship of responses between academic staff, students and employees in the ee

measures include error measures and correlation matrix measures and their performance results are summarized in Table 2 and 3, respectively.

Tables of recommendations: Recommendations are provided in the form of tables based on the number of correct answers that resulting from comparing the participant's answers with the optimal answers that are stored in the TMRS. These recommendations are divided into 4 groups, respectively as follows:

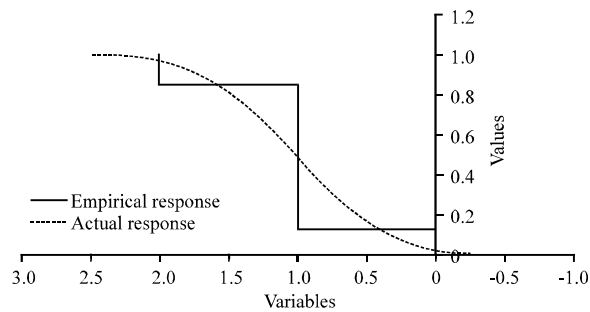Fig. 8: Cumulative distribution function for empirical and actual responses

- Correct answers between 0-14
- Correct answers between 15-24
- Correct answers between 25-39
- Correct answers between 40-50

This was done for each category and the recommendations tables are presented in Table (4-8). Table 4 illustrates the recommendations for the target categories that their correct answers ranging from (0-14). These recommendations are shared among all the target categories that include students, employees and academic staff.

Recommendations for those their correct answers ranging from (0-14): Prepare a weekly schedule for the necessary goals to be achieved. Select targets and arrange them according to importance to make it clear which target you should fully carry out and focus on first. After the completion of the research table make adjustments. Save time within the schedule for emergency tasks. Simplify the research by dividing it into small steps. Start working to complete the first step, watch your success to that step and then research on the second step and so on. Do not keep studies scattered in your office or home, get rid of unnecessary papers or if you do not need them during the week organize them in a clear place. Take advantage of the wasted time. For example, reduce the time for sleeping 1 h, reduce the time watching television or using the internet for entertainment to just 1 h/day. When you face a problem, think about more than one solution and select the proper one instead of insisting on a specific search for a solution and take a lot of your time in searching. Do all your similar tasks together, this will make easier to handle and manage. Identify the things that could waste your time. For example, talking with colleagues at work, answering phone calls and others, you should try reducing them. Specify the type of work that you want to start and then learn everything that is

important to know about that work and also be sure that all required information and tools are available to help starting and continue the work without interruption. Exploit periods of early morning and evening where the mind better able to absorb information. When you set big goals perhaps you will start thinking that it is impossible to achieve these goals and then begin to decline and modify these goals. Think about the smaller goals that are steps on the way to achieving these even larger goals.

If you are a student, the following recommendations will help in managing your time: It is preferable to get sleep at least 7-8 h period, preferably from 11-7 am. Specify the time you spend at the university or school within your scheduled time table, it is estimated at almost 6 h/period in order to be able to manage your time well. Leave enough time for entertainment like sport, development activities and reading, rest, eating and other necessary things, this time should not exceed 2 h. Usually, the lost time in transportation is between 1-2 pm for that, try to exploit that time for self-development activities like reading or by doing anything else that will bring to you benefits. Specify a dedicated time for studying or reading within 4 h and make sure it does not exceed that duration.

If you are an employee, these recommendations will help in managing your time: After hours of work there should be a break time, to eat or rest or recreation, this time period is not <2 h. You should allocate a portion of your scheduled time table for having personal relationships with your family and friends this time not to exceed 4 h. Specify a time period for reading books, research papers, etc. This time should not exceed 2 h.

If you are academic staff, the following recommendations will help you organize your time: Control well the sleeping hours amount and be sure it's about 6-8 h, except if your case requires more than this amount. Select a time to work which is estimated at about 6 h within your scheduled time table. On the other hand, you should complete what is required to do properly to avoid accumulation of work. Must be determined within your daily scheduled time for rest, recreation or for your own purposes, so that, you can continue completing the rest of the work and that time should not exceed 2 h. Allocate part of your time to help your family with either things related to your family or one of your family members and should not exceed 3 h. The time period which might be lost in transportation is usually about 2 h. Try to exploit this time period in reading such as books, newsletters or any other useful works. Identify within the scheduled time table a time period for reading a book or doing a special

research to your work and make sure that this time does not exceed 3 h. These recommendations for each target categories that their correct answers ranging from (15-24) are provided. These recommendations are different t o each target categories. The recommendations for the students. It provides a number of recommendations for employees and the recommendations for academic staff are illustrated, here, respectively.

Recommendations for the students: Write down your works in a table, then arrange them according to importance and specify which works should be done first and which will be later on. Setting up a time management program and implementing its content will help in assuring successful implementation necessary to assure such a standard has been achieved as well as the self-insisting by the student to implement the program achieves the success for them. Before sleeping, try to think about what can be completed in the next day. And also, after waking up, you should think about what you will accomplish during this day. Commitment to sleep only 8 h period total and not more than, except in emergency cases only where the laziness and comfort do not benefit and make a person in a state of inactivity and not the strength to perform the requirements. Exploitation period of the early morning and the evening to study where during that time period the mind is best at assimilation of information. Do not fear failure, if at first you do not succeed, then you should keep trying better ways to manage your time and at the end you will succeed. Do not postpone today's work until tomorrow because there is no dedicated reason for that you should be firm with yourself and do not leave until later or postpone the things. Be sure to have finished the whole work and then move to other one, this allows focusing only on just one task. First, read the subject in general to see the big picture a little more clearly to you and then re-read the subject at slower speed to absorb the rest of the ideas. It is a good idea to keep a pen and paper to record your thoughts and plans during free time. Do not allow the tasks piling up in front of you to cause frustration and confusion in determining where to start., Just specify a certain period of time for each task, meaning the task can take only the amount of time that you specify: no more, no less. This way, the task will be completed and then start working on other tasks. Do the tasks that you love to do or because it will help someone else and reward yourself after completing the work by a small amount of rest, this will benefit you, your health, mind and body. Between each task and another, take a look at the list of tasks that were written down in the beginning to determine what has been completed as well as to rearrange your priorities according to the new tasks on a daily basis. Do not work task that have to be done by someone else: it is better to focus on your own projects

and tasks. Treat errors quickly by correcting them immediately a series of mistakes are then difficult to treat and thus, is a way for the loss of time without the benefit. Do not put yourself under pressure when setting up your time table but draw closer to success. Contain your plan time for rest, sports and entertainment to engage your-self in social activities because it represents the driving force of success and achievements. Do not surf the internet while studying and decide to meet your friends at the time that you specified for work or study. Whatever we do today will become a part of our past tomorrow. Try to benefit from the mistakes of the past to achieve success in the future and to make ourselves proud of that. Consequently, you should try at the end of each day to review your performance and values during in order to assess your-self. Ask yourself what is the time you lost, why and how to get benefit from it. Select dates for yourself, put a limited amount of time to complete or to do things of great importance that lead to success such as setting aside time to any act or important conversation instead of including yourself only for list of things that you must do. You can devote the time for high-reward projects that can make a real difference in your life instead of devoting the time to respond to e-mails or return phone calls.

The recommendations for employees: Create a table and write down all of your thoughts, your words and your actions daily. This table could help you understand the size of the things that can be implemented during the day. Place within the time table some time for unexpected crises as reserve time to protect a task from any delay and to deal with unexpected crises or to deal with situations in which you have no control over determining the beginning or completion points such as conference, meetings and others that you have and are required to attend. Make simple projects after the completion of the most difficult and complex projects. This will give you more incentive to finish the difficult projects and then to start working on projects with less difficulties. At end of the day organize your workspace, arrange your office space in preparation for the next day. Once, you determine the tasks to be implemented, set up a prioritized list of the tasks required to implement according to importance as well as the estimated time for each task. Each task can take only the exact amount of time that you specify no more, no less. This will help you track how much time each task will take and to complete all the tasks as well. Make sure you give enough time for each task to complete all the list of tasks. On the other hand, you should take into account what happens from disruption or in convenience during the research. Do not postpone important things for last moment just for being unfavorable to you. The tasks will become unfavorable when postponed work on them as their time has come. Try to sort and set aside a specific

time for routine functions or tasks such as accessing e-mails or talk with your boss and other. Plan for phone calls and make yourself a blueprint of what you want to say and what you want to achieve from the call. If you make more than one phone call a day, it is preferable to collect all the calls made simultaneously. Schedule time periods for rest that represent the lowest stages of physical activity and psychological to you. Plan some time to discuss the issues between colleagues or helpers such as ideas, opinions and problems: after that, try to avoid the interruption for the rest of the time. Learn to say "no", especially, when it will be the reason for wasting your time as well as without any interest to you. Feeling of pressure and fatigue does not come from the work carried out but due to the concern and thinking with the works that have not been completed yet. Shepherd between work-life balance, for example, aside time for family, attention to your health, sports. Distinguish between the important decisions that should be postponed for a specific time for further research or study and delay the irrational or unjustified. If the nature of your work includes storage material or files that frequently others like to look at, it is preferred to put in another location other than a place to increase your focus. If your colleague insisted you on an urgent matter, ask about the amount of time that the matter may require and then comply with that time or tell him the amount of time that you can allocate to him to draw his attention to the fact that you have a dedicated and limited time. You will never be wise unless you love reading and when you do not find any interest or benefits from what you are reading then you have to stop yourself about reading due to lack of Interest and benefit. Reduce the time for watching television, view only the programs that have been identified in advance within your scheduled time table.

The recommendations for academic staff: Prepare a list that shows what your life could be for your daily activities. Leave time for the rest and also for yourself and your family. Set aside time to accomplish things that require sharp focus, be careful not to interrupt you through it. Prepare everything you need to start working on a task to avoid interruptions while you are working. Beware of emergencies such as visitors, phone calls, etc. and finish those, then immediately continue the work. Before sleeping, you have to spend some time to set a list of what you need to do. One of the best ways of becoming more effective at work is to focus on accomplishing a single task, then performs similar tasks sequentially and do not leave the task until the task is finished because each task is assigned an exact amount of time. If you cannot accomplish some tasks then do not cancel or delay, write it down and add it to the next day's list. You can customize certain hours to conduct all of

your communications which will reduce and exploit a lot of time. Take an adequate amount of rest to make you able to accomplish your work effectively and know the times that you are with high mental energy for every day and be ready for these times. Arrange work files, tools in a way that you can easily access them quickly when you need to instead of the time consuming task of looking for them. Avoid doing multiple tasks at once because this could require a long time to focus on the activity do one project at a time. Do not hesitate to say "No". You know what you need to accomplish each day or during the week, this will help you to say for example, "I cannot help you because I have to complete the first important project" and thus, will help you to avoid commitment to another new number of tasks. Put a mark for the accomplishments in terms of what you did within the schedule to give yourself focus, motivation and a sense of accomplishment. Make sure to give yourself enough time to carry out the list of tasks that take into account what happens to you from interruptions while working daily.

The recommendations for the target categories that their correct answers ranging from 25-39 and they will be shared among the students, employees and academic staff.

The recommendations for those their correct answers ranging from 25-39: Prepare a table or list of tasks that must be accomplished that include all the ideas that are in your mind. Arrange your table or your list based on its importance. The easiest way to do this is by classifying each material into three main sections:

- Important and urgent
- Important and not urgent
- Is not important or urgent

Take a break for 15 min to make your mind fresh and to get back with full concentration. At all times, focus on your targets to be aware of your goal and then you will feel accomplishment achieved when completing each task. Keep your office empty, except the tools that you actually use and need. By doing this, your focus will increase sharply and your office reflects your personality and your use of your time. Ask yourself questions before starting any work and also at every step in any activity including: What? Where? When? How? Why? Make sure you have the answers to those questions. Answering these questions will help you find ways to be more efficient as well as help you to identify the most important duties of the activities. Spend at the end of each day 10 min preparing for tomorrow by writing a list of the priorities of the tasks for the next day in advance. Exploit your times when you're at peak energy to accomplish the most

urgent and difficult tasks and also, expand the use of just in time techniques for each task, you then will become more adept at identifying the required time for any task. Before you begin the project, prepare all the basics and essential tools that you need to start the work without interruption to complete tasks. Start immediately and do your job right now without delay. If you do not start the work, it will not end. If you waited for regularity of things, it could lose all the things. Every human has a limit of time and energy. Give yourself permission to say the word "no". In this regard, though, be diplomatic and say, "If I could, I would but I was committed with another project." If you have extra time, work on the most important step because it gives you the highest value or yield the largest. Also, continually ask yourself, "What is the best investment for my time, now?" and then do more things in order to achieve more goals and to increase the productivity. If you face a problem such as shortness of time, take 5 min to think about it first. Find reasons for the delay. Motivate yourself to analyze the reason for being late on this project and then address these reasons. Face your fears to take positive action. Do not start a new job before finishing the previous one or at least, not before the end of enough to me on the previous task. Increase your achievement to move immediately to the next task or step, more accomplished tasks one after the other will increase the probability of increasing productivity. Stick to your work schedule. Save time and complete the tasks with minimal losses. Estimate time required for each task and adds some time to them because certainly the task will take a longer time than expected and estimated. Take advantage of wasted time, for example, while you wait in transportation, you can read a book, newspapers, remember God or rearrange the things of the day, all of which will exploit the wasted time. System your time for rest, trips and holidays: breaks even need to be schedule in the system. Therefore, you should make deliberate choices to exploit the time with family and make the best use of the time you spend away from the pressure of work. Move away from the provincial personal when doing your work, look for a remote location to work or change your time to be at the top when accomplishing the tasks. Calm down, focus on the task and ignore anything else such as tension that makes the task seem harder than it is. Understand exactly what you should do and try to feel calm, comfortable and confident. Review the works that have been done at the end of the day and all the time ask yourself what was lost in things that are not important or can be delayed for another day. The impact on implementing this will help in achieving better results. Organize your time for large-scale projects by breaking them down into small tasks to become less difficult and see it as a series of small tasks, then focus on what you absolutely need to accomplish, one after another.

It is also highly recommended for the participants who total correct answers are ranging from 40-50 to keep continuing in this manner to be role models to others on how to, manage, synthesize and utilize the time effectively.

CONCLUSION

This study focused on the development of a TMRS to enable students, academic staff and employees better understand and exploit to their time effectively within the EE. The proposed TMRS results provide a way for the target groups to gather key information about probable trouble areas, potential areas for development and what to do to manage, use, plan, exploit and get the maximum value from their time. There is a strong relationship between time management and self-management. Consequently, proper self-management is the most important factor for effective of time. Time management does not mean doing the work more quickly but adopting proper ways to do the required research in order to meet the desired goals in an effective manner. However, many people do not care about the effective use of their time or organizing their lives. Wong and Tee (2016) confirmed that time management and the skills to deal with time are complement to each other's. For this, a person cannot manage his/her time without having the necessary skills to deal with the time.

Proper time management includes planning, regulation, prioritization, evaluation and control that can help in increasing efficiency, productivity as well as reducing the number of errors. In this research, the TMRS was developed and a set of fundamental recommendations for each category was generated. The results provide a way for the target groups to gather key information about probable trouble areas, potential areas for development and what to do to manage, use, plan, exploit and get the maximum value from their time.

RECOMMENDATIONS

This research proposed a TMRS and its aim is to know the extent utilizing the time in EEs. This research also aimed to provide students, employees and academic staff an effective way to specify the required areas for development and essential guidelines to better manage and exploit their time through a set of recommendations that the system will generate for each category. We believed that this research will be beneficial for developing TMRS to teach skills focusing on learning for EEs with a specific focus on developing students, employees and academic staff to be more productive. Finally, we hope this system contributes towards better improve time management use in teaching and learning within the EEs.

Appendix A:

Overall questions used in the questionnaire, overall questions relating to the questionnaire on time management

		Answers		
No.	Questions	No	Sometimes	Yes
1	Do you plan what do you want to do in the start of every day?			
2	Do you organize a daily schedule to accomplish the assigned tasks to you by putting them in order from most to least important and take with the estimated initial time for each task?			
3	What about unexpected events do you make simple adjustment to your daily schedule?			
4	Do you think, depending on our sense and thoughts are good way to achieve the desired goals?			
5	Do you organize your time and you can easily find the required files?			
6	Are you trying to find a solution for problem/problems you experience from the first try?			
7	Do you find difficulties to begin working and focusing on the task?			
8	Do you exploit spare hours to execute the most difficult business?			
9	Do you spend your free time searching for basic information?			
10	Do you allocate a place for all things in order not to waste the time to look for?			
11	Are you do an active effort to reduce the interrupts common or wasting time (visitors, meetings, phone calls) that hinder your business down?			
12	What you will say in case someone asks for a favor and this will affect or prevent you to complete your task/tasks?			
13	When you have a lot of works, do you carry out intermittently?			
14	Do you specify a particular time to discuss problems, difficulties relate to your goals with competence?			
15	Do you think that it is necessary to ask whether the time for the assigned task is enough or not?			
16	In case assigning tasks to others, do you also assign enough time to them to complete that tasks?			
17	Are you unable to return to work after the interrupts atmosphere the same activity?			
18	Do you exceed the dedicated time to complete the activities assigned to you?			
19	Are you setting up tasks procedure/plan to eliminate the working and the discussing time for a task?			
20	Do you be compelled to attend early or stay late to finish your work?			
21	Do you take advantage of your time while you are in the car to read something useful or do another job you have accumulated?			
22	Can you comfort during spare time and there is no need to worry about finishing your work?			
23	Are you planning to employ your spare time between the daily hours rest to help you with helping others?			
24	Do you spend a number of hours watching the TV or using of electronic devices?			
25	Do you forced to do some tasks of your job at home in the evening or vacations?			
26	Do you organize your time only for large projects?			
27	Do you arrive on time of your work, meetings or lectures?			
28	When you manage your time efficiently, do you feel a high sense of responsibility and increase in your skills?			
29	Do you prefer to complete the work assigned to you on time and without delay?			
30	Usually do you like to jump from one task to another and then back to the first one?			
31	Do you work on the fragmentation of the big tasks into small ones in order to facilitate completion of them?			
32	Do you think, the organization's the time is an important factor in achieving the desired results?			
33	Do you need more time to complete your business?			
34	For better and effective time management is it good to reduce the time spent on activities, multi?			
35	While you are reading papers, do you re-read it, fearing to be forgotten some important points?			
36	Do you feel that the time you waste, cannot be compensated?			
37	Do you keep in time schedule table that allows you to cope with crises in emergency?			
38	Do you find that the lacking of time, an excuse to delay or put off some of the work?			
39	Are you from people who are trying to accomplish duties but without ensuring of success?			
40	Do you take from your personal things time over things that relate to work during working hours?			
41	Do you find yourself occasionally doing the work of others or have you ever done any volunteer work			
42	Do you feel you do not have enough time for yourself during the day?			
43	Are you a compressed in work and unable to comfort? Do you find yourself a compressed in work and unable to comfort?			
44	Do you feel depression or feels down when a whole day of your time is missed?			
45	Do you sit down with yourself at the end of each day and start thinking about what to do tomorrow?			
46	Have you ever had any failures and did you learn from them?			
47	Did you achieve your goals quickly or took with you plenty of time?			
48	Did you in appoint and review the weekly goals and successes?			
49	At the end of day, do you feel like you did not accomplish the required work from you?			
50	In general, do you feel that you are controlling your time?			

REFERENCES

Aduke, A.F., 2015. Time management and students academic performance in higher institutions, Nigeria-a case study of Ekiti State. Intl. Res. Educ., 3: 1-12.

Akomolafe, C.O., 2005. Principals time management abilities in secondary schools in Nigeria. Niger. J. Educ. Administration Plann., 5: 58-67.

Cetin, G., T. Demirciftci and A. Bilgihan, 2016. Meeting revenue management challenges: Knowledge, skills and abilities. Intl. J. Hospitality Manage., 57: 132-142.

Crawford, I. and Z. Wang, 2016. The impact of placements on the academic performance of UK and international students in higher education. Stud. Higher Educ., 41: 712-733.

Grave, B.S., 2011. The effect of student time allocation on academic achievement. Educ. Econ., 19: 291-310.

Grissom, J.A., S. Loeb and H. Mitani, 2015. Principal time management skills: Explaining patterns in principals time use, job stress and perceived effectiveness. J. Educ. Administration, 53: 773-793.

Hamzah, A.R., E.O.I. Lucky and M.H.R. Joarder, 2014. Time management, external motivation and students' academic performance: Evidence from a Malaysian Public University. Asian Social Sci., 10: 55-63.

Hurtienne, J., U. Stilijanow and G. Junghanns, 2014. Time and Work Pressure in Today's Working World. In: The Impact of ICT on Quality of Working Life, Korunka, C. and ýP. Hoonakker (Eds.). Springer, Dordrecht, New York, ISBN:978-94-017-8853-3, pp: 63-85.

Macan, T.H., C. Shahani, R.L. Dipboye and A.P. Phillips, 1990. College students' time management: Correlations with academic performance and stress. J. Educ. Psychol., 82: 760-768.

McCuen, R.H., 1996. The Elements of Academic Research. ASCE Press, New York, USA., Pages: 287.

Moreno, C.R., A. Lowden, S. Vasconcelos and E.C. Marqueze, 2016. Musculoskeletal pain and insomnia among workers with different occupations and working hours. Chronobiol. Intl., 33: 749-753.

Nadinloyi, K.B., N. Hajloo, N.S. Garamaleki and H. Sadeghi, 2013. The study efficacy of time management training on increase academic time management of students. Procedia Social Behav. Sci., 84: 134-138.

Reynolds, D.A., R.C. Rose and M.J. Smith, 1990. A mixture modeling approach to text-independent speaker ID. J. Acoust. Soc. Am., 87: S109-S109.

Ruiz-Gallardo, J.R., J.L. Gonzalez-Geraldo and S. Castano, 2016. What are our students doing? Workload, time allocation and time management in PBL instruction: A case study in science education. Teach. Teach. Educ., 53: 51-62.

Scott, L. and E. Saaiman, 2016. Promoting reading skills or wasting time? Students perceived benefits of reading in an intermediary programme at the Vaal University of Technology. Reading Writing J. Reading Assoc. South Afr., 7: 1-11.

Sharma, N. and P. Nayak, 2016. Study on work life balance and organisation policy in IT sector in NCR. Amity Global Bus. Rev., 11: 115-122.

Swart, A.J., K. Lombard and D.H. Jager, 2010. Exploring the relationship between time management skills and the academic achievement of African engineering students-a case study. Eur. J. Eng. Educ., 35: 79-89.

Talib, N. and S.S. Sansgiry, 2012. Determinants of academic performance of university students. Pak. J. Psychol. Res., 27: 265-278.

Timilehin, H. and O. Adenike, 2013. Time management skills and administrative effectiveness of principals in Nigerian secondary schools. J. Educ. Dev. Psychol., 3: 133-139.

Wong, S.Y. and W.J. Tee, 2016. Students Pre-Assessment Analysis to Improve Academic Performance and Thinking Skills. In: Assessment for Learning Within and Beyond the Classroom, Tang, S. and L. Logonnathan (Eds.). Springer, Singapore, ISBN:978-981-10-0906-8, pp: 373-380.