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MONITORING THE TIME SPENT BY THE STUDENTS IN HIGHER EDUCATION TASKS

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1. ABSTRACT:

The amount of time spent by the student in learning is an important factor to be considered in the student's achievements. This paper proposes different survey templates for measuring the time spent and the student's opinions regarding a given task, comprising both individual and group activities and also tasks performed in the classroom and at home.

The method proposed in this paper is available at the *Universitat Politècnica de València* for Architecture and Engineering Degrees to obtain corrective feedback. This information is very useful for the professors in order to schedule the lectures efficiently according to the actual time spent by the students.

2. **Keywords:** Task scheduling, time spent, student survey, corrective feedback

3. **FIELD OF KNOWLEDGE:** Engineering and Architecture

4. **SUBJECT AREA:** Innovation In Higher Education

5. **PRESENTATION CATEGORY:** Poster Presentation

6. **Development:**

a) Objectives

The main objective of this work is to report a compilation of several student survey templates in order to obtain corrective feedback after the realization of different Higher Education tasks. This idea comes up from a group of professors from the *Universitat Politécnica de València* from diverse architecture and engineering degrees after considering that the amount of time spent by the student in learning is an important factor to be considered in the student's achievements. It was observed that in some cases, the time scheduled for a given task did not correspond to the actual time spent by the students in the realization of the task. For this reason, different survey templates were designed for measuring the time spent by the students in a given task and also the student's opinion regarding the description of the task, the contents and difficulty of the activity.

b) Introduction

The European Higher Education Area (EHEA) implementation in Spain implied changing from the teaching methodology focused on contents to a methodology focused on competences. The methodology based on competences enhances the developments of new activities in the classroom. For example, cooperative work for the evaluation of real cases to deploy different competences related with a given subject is heavily encouraged for Engineering and Architecture degrees. In the last years, it has been necessary to make an effort to innovate in the educational methods, proposing different learning activities to promote learners' responsibility and autonomy and also to improve the results obtained in the learning process. But these changes should be accompanied by the measure of total

time spent by the students in order to make easier the adoption of ECTS system, necessary for integration into the European Higher Education [1]. For this reason, an efficient technique for monitoring the time spent by the students to prepare and develop a given task or content is necessary nowadays.

The design of Higher Education activities should take into account, among other factors, the learning style of students [2] related with the nature of the concrete subject. When designing a Higher Education activity, it is important to define clearly the main objectives of the task, e.g. talk to the students about why they are studying what they are studying, and also contextualise aims and skills within the subject and with other subjects [3-4]. But, even if the objectives where defined at the beginning of the activity, often the students get lost during the realization of the task, so it is also important to check with the students that they were clear about the aims of the activity.

It was also observed that obtaining the group feedback concerning peer-assessment of the work done by the students can help the teacher to be aware of the learning needs. For this reason, we found interesting to find a quick and efficient way of obtaining this feedback from the students. What we propose is to use a short student survey after finishing a given task to obtain direct feedback from the students.

In this paper, different survey designs are reported, considering individual and group activities, and also tasks done at the classroom, in the laboratory and homework.

The survey asks the student the real amount of time they spent to prepare and finish the task. This point is very important to confirm or not if the professor scheduling was well-defined for the activity difficulty [5] and also for the ECTS estimation.

The final purpose of this work is to monitor the time spent by the students in different tasks in order to be able schedule the different activities efficiently to obtain the best learning results for the students. In addition, the survey obtains information regarding the opinion of the student regarding the preparation, definition, difficulty and comments of the given activity. From these answers, the professor can extract useful information regarding the problems the students faced when developing the activity, if the activity was well-defined or needs adjustments, and also the personal opinion about what the students would like to know about a given topic.

c) University framework

This work was performed by a group of professors from different departments of the *Universitat Politécnica de València* (UPV) teaching subjects in Engineering and Architecture Higher Education degrees. In summary the different departments comprise: Communications department from Telecommunications Engineering (*Departamento de Comunicaciones*), Urban planning, Land Use Planning and Administrative Law department (*Departamento de Urbanismo, Ordenación de Territorio y Derecho Administrative*) from Civil Engineering Degree, Department of Geotechnical Engineering (*Departamento de Ingeniería del Terreno*) and Architectural Constructions department (*Departamento de Construcciones Arquitectónicas*) from Architecture Degree and Building Engineering. In the development of these investigations, the group of professors proposed an initial survey model and the survey was updated according to the different tasks and including comments and feedback from the students. This group of 5 professors from different subjects in Engineering and Architecture degrees were supported by the Institute of Education Sciences (*Instituto de Ciencias de la Educación* or ICE) from the UPV. The ICE is an institute of the UPV responsible for helping teaching offering training, support and advice to professors in the area of university pedagogy and facilitating the dissemination and use of new educational technologies and resources, contributing to the process of innovation and quality assessment of the education. Feedback from the ICE experts regarding the survey proposals was included in the updates of the survey for the different tasks.

d) Survey design and development

In the initial design of the survey a first model (Figure 1) was proposed including information of the time spent to develop the task and some extra information regarding the opinion of the students about general interest, application of the activity, difficulty of the task, provided materials, between others. Also, dedicated questions will be allocated for individual activities and group activities in order to observe if the work in group achieved the established goals. Also the team of professors decided to seek advice with experts and consulted the *Instituto de Ciencias de Educación* (ICE) from the UPV. From the first proposal of questions considering different types of activities we can summarize these questions:

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Q1.1. *What have you learned in this activity?*

Q1.2. *Which degree of applicability do you think this activity has related with the subject?*

Q1.3. *Have you strengthened your knowledge on the subject?*

Q1.4. *Are the topics of this activity interesting for you?*

Q1.5. *Have you done an activity with similar contents before?*

Q1.6. *What is the degree of difficulty of the activity?*

Q1.7. *Do you consider the activity as a good complement to the theory?*

Q1.8. *Were you able to use the all devices in the lab session? (for laboratory tasks)*

Q2.1. *What are the most significant challenges you faced when doing the task? (0 = no difficulty, 6 = maximum difficulty):*

- Speaking in public *(for oral presentations)*
- Working in groups *(for group activities)*
- Time available to prepare the task
- Time assigned to perform the activity
- Suitability of the distribution of class / lab / exhibition space

Q2.2. *Now that you've done the activity, would you improve your preparation before starting the development? Select how:*

- Collection of material
- Improve oral communication *(for oral presentations)*
- Organization of group tasks *(for group activities)*
- Exposure time management *(for oral presentations)*

Q2.3. *Do you want to make any recommendations to the teacher to improve the quality of the activity?*

- Training-orientation in public speaking *(for oral presentations)*
- Time scheduled for preparation
- Time scheduled for completion of the task
- Clarity of evaluation criteria
- Other ...

The contributions of all the professors finally make up a survey model that was considered suitable for testing students. Figure 1 shows the first survey template used as a base for the development of the other surveys.

It can be observed that the survey doesn't include the name of the student to obtain objective results. But the age of the student is interesting for the evaluation of the answers. Also this survey includes options for stand-alone work and work in group. As it was commented before, the time spent for the development of the activity done at the classroom and also in the preparation before or after the lesson is considered.

After the preparation of the initial survey template, the student's feedback regarding the structure and contents of the survey was considered to further improve the survey for different tasks.

Figure 2 shows two different templates proposed for evaluating a practical session in a subject of Architecture Degree and a laboratory session in Telecommunication Engineering Degree.

It can be observed that the main difference is the interest on the availability of resources at the laboratory to ensure that all the students were able to check by themselves the contents of the lessons. Also it is interesting to identify if the students have performed similar studies before to avoid overlapping between different subjects.

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PERSONAL DATA			
AGE	**.....years**	**□ Male □ Female**	
ACTIVITY INFORMATION			
TYPE	□ Problem □ Practical □ Task □ Exposition □ Other:.....		
DATE	...../...../.....		
CONTENT	.....		
TIME SPENT INFORMATION			
METHODOLOGY	□ Stand-alone □ Group (□ Both)		
	□ Done at the classroom □ Done at home		
TIME SPENT	TOTAL ..... hours		
	TIME SPENT AT THE CLASSROOM ..... hours		
	TIME SPENT OUT OF THE CLASSROOM ..... hours		
OPINION			
1. Have you strengthened your knowledge on the subject? □ **None** □ **Low** □ **Medium** □ **High** □ **NA**			
2. Are the topics of this activity interesting for you? □ **None** □ **Low** □ **Medium** □ **High** □ **NA**			
3. Do you consider the proposal was well-oriented? □ **None** □ **Low** □ **Medium** □ **High** □ **NA**			
¿why?			
4. What is the degree of difficulty of the activity? □ **None** □ **Low** □ **Medium** □ **High** □ **NA**			
5. Do you consider the activity as a good complement to the theory? □ **None** □ **Low** □ **Medium** □ **High** □ **NA**			
6. What are the most significant challenges you faced when doing the task? (0 = no difficulty, 6 = maximum difficulty):			
	Lack of previous knowledge		Interest of the activity
	Poor previous theoretical explanation		Available resources
	Time available for the task		Work environment
7. Now that you've done the activity, would you improve your preparation before starting the development?			
8. Other comments:			

Figure 1. Initial survey template comprising different activities: problem, practical, tasks and presentation

(a)

PERSONAL DATA	
AGE	**.....years** **□ Male □ Female**
ACTIVITY INFORMATION	
TYPE	Practical
DATE	...../...../.....
CONTENT	.....
TIME SPENT INFORMATION	
METHODOLOGY	□ Stand-alone □ Group (□ Both)
TIME SPENT	TOTAL ..... hours TIME SPENT AT THE CLASSROOM ..... hours TIME SPENT OUT OF THE CLASSROOM ..... hours
OPINION	

1. What have you learned in this activity?

.....

2. Which degree of applicability do you think this activity has related with the subject?

□ None □ Low □ Medium □ High □ NA

3. Do you consider the activity as a good complement to the theory?

□ None □ Low □ Medium □ High □ NA

4. The place where the lesson took place was:

□ Adequate □ Non-adequate □ Medium (why?.....)

5. The duration of the lesson was:

□ Adequate □ Non-adequate □ Medium (why?.....)

6. The approach to the topics was:

□ Adequate □ Non-adequate □ Medium (why?.....)

7. Laboratory resources were:

□ Adequate □ Non-adequate □ Medium (why?.....)

8. The group relation was:

□ Adequate □ Non-adequate □ Medium (why?.....)

9. Now that you've done the activity, would you improve your preparation before starting the development? Select how: (0 = less priority, 5= high priority):

	Previous knowledge		Group work
	Theoretical concepts		Collection of material
	Time dedicated to the task		Distribution of the class/lab

10. Other comments:

(b)

PERSONAL DATA	
AGE	**.....years** **□ Male □ Female**
ACTIVITY INFORMATION	
TYPE	Laboratory session
DATE	...../...../.....
CONTENT	.....
TIME SPENT INFORMATION	
METHODOLOGY	□ Stand-alone □ Group
TIME SPENT	TOTAL ..... hours AT THE CLASSROOM ..... h OUT OF THE CLASS ..... h Study of previous work .... h References research .... h Work after the session .... h Consultancy .... h
OPINION	

1. What have you learned in this activity?

.....

2. Which degree of applicability do you think this activity has related with the subject?

□ None □ Low □ Medium □ High □ NA

3. Do you consider the activity as a good complement to the theory?

□ None □ Low □ Medium □ High □ NA

4. Were you able to use the all devices in the lab session?

□ Adequate □ Non-adequate □ Medium (why?.....)

5. The duration of the lesson was:

□ Adequate □ Non-adequate □ Medium (why?.....)

6. Have you done an activity with similar contents before?

□ Adequate □ Non-adequate □ Medium (why?.....)

7. Now that you've done the activity, would you improve your preparation before starting the development? Select how: (0 = less priority, 5= high priority):

	Previous knowledge		Group work
	Theoretical concepts		Collection of material
	Time dedicated to the task		Comprehension reading

8. Any other recommendation to improve the quality of the activity?

	Time scheduled for the task		Material provided
	Clarity of evaluation criteria		Availability of devices
	Clarity of the proposed activity description		Summary of theoretical concepts

Figure 2. Survey template for (a) practical in Architecture degree, (b) laboratory lesson in Telecommunication Engineering degree

Finally, Figure 3 shows a survey template for evaluating the development of a group activity of a joint work to be presented in an oral presentation to the rest of the students. In this case the time spent in the task is classified in the research of references, study of previous work, preparation of the work, consultancy with the professor, and the preparation of the slides for the presentation. With this classification we will be able to identify roadblocks if a big difference in the schedule is observed.

Also, the questions regarding the improvements they propose for following similar activities permits that the students can obtain conclusions about their scheduling in order to improve their preparation in further tasks.

PERSONAL DATA			
AGE	.....years	□ Male □ Female	
ACTIVITY INFORMATION			
TYPE	Guided work and oral presentation		
DATE	...../...../.....		
CONTENT	.....		
TIME SPENT INFORMATION			
METHODOLOGY	□ Stand-alone □ Group (□ Both) □ Done at the classroom □ Done at home		
TIME SPENT	TOTAL ..... hours AT THE CLASSROOM ..... h OUT OF THE CLASS ..... h	Study of previous work .... h References research .... h Work preparation .... h Consultancy .... h	
OPINION			
1. What have you learned in this activity? ..... **2. Which degree of applicability do you think this activity has related with the subject?** □ None □ Low □ Medium □ High □ NA			

3. What are the most significant challenges you faced when doing the task? (0 = no difficulty, 6 = maximum difficulty)			
	Main topic of the activity		Time available for the task
	Lack of previous knowledge		Time dedicated by the student
	Distribution of the classroom		Exposition preparation
4. Now that you've done the activity, would you improve your preparation before starting the development? Select how: (0 = less priority, 5= high priority):			
	Previous knowledge		Comprehensive lecture
	Time scheduling		Tasks organization
	Consulting the teacher		Other (which.....)
5. Do you want to make any other recommendation? □ Time scheduled for completion of the task □ Material provided □ Clarity of the proposed activity description □ Clarity of evaluation criteria □ Other **6. Other comments:**			

Figure 3. Survey template for guided work and oral presentation at class

The different surveys were also prepared in an online tool at the *Universitat Politècnica de València*. In this way, the collection of the answers only takes 5 minutes after finishing the task, and it can be answered at the laboratory or even at home after finishing a homework task. This tool is being used in the current academic year (2011/2012) in Engineering and Architecture degrees.

The results obtained from this survey are very useful to identify roadblocks and propose corrective actions if needed, and will be evaluated in a 3 year period study to improve the design of the different tasks. Some preliminary analysis on the obtained data and on the feedback opinion from the students is reported in the next section:

e) First analysis, experiences tested and feedback obtained from the students

In first case, the first survey shown in Figure 1 was evaluated in Telecommunication Engineering and Architecture Degrees in a problem-based task. The outcome from the survey reflected the importance of checking references and other materials at home before or during the lesson and also highlighted the necessity of a better time scheduling of the students for the realization of each activity during the course.

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For instance, the results obtained from the evaluation of the third-year subject titled "Telecommunication networks and systems" (*Redes y sistemas de Telecomunicación 1* with UPV code 11272) of in Telecommunication Engineering degree at the *Escola Politècnica Superior de Gandia* of the *Universitat Politècnica de València* shown that the time spent at home to solve the problem was more than 4 times what was planned and was not in accordance with the time spent by the same group of 20 students in solving a similar problem at the classroom. This pointed out that the students need to plan the home activities more efficiently and also review the subject contents more regularly, so when problem activities are proposed they won't need to spend a lot of time reviewing the theoretical concepts from the beginning of the semester. In this case, the students demonstrated a good acceptance of the survey, as they were then aware of the issues they experienced during the development of the task and they will know how to work more efficiently in next activities. Following this advice, the survey was provided for another task one month after the previous one and, although the time spent results are a little higher than what was expected, it is less than a 35% (in average) of the time spent in a similar task done at the classroom.

Another subject in which the developed surveys were used is called "Special foundations" (*Cimentaciones Especiales* with UPV code 6316). This subject is an optional subject of the last year in the Architecture Degree of the UPV. The aim of the subject is to provide a global vision of the behaviour of the soil as continuum mechanics, porous medium and composed by phases that interact. It focuses on the knowledge of the response of the soil opposite to exterior actions, which determine the soil structure interaction. These exterior actions distort the soil balance which may result soil deformations, water flow or even breaking ground. Moreover, it studies soil surveying techniques and different kinds of foundations which allow solving some professional problems.

Also, a group task oriented to a project development group including oral presentation was evaluated with the survey shown in Figure 2(a). This task was done in the subject "Refurbishment and Conditioning Services II" (*Acondicionamiento y Servicios II* with UPV code 6233) on the fourth year of Architecture Degree. The course consists of three blocks: Lighting, Electrical and Environment and each block is divided into theory and practice. The number of students each year ranges between 500 and 600 divided into 5 groups of theory, each group is subdivided into three subgroups for practice. The survey

was proposed for the practical part of the block of Lighting (*Luminotecnia* topic). The first set of conclusions reached by the students in this activity can be summarized in:

- The development of the practical lesson is interesting because it applies and consolidates the knowledge the students acquired during the theoretical lectures.
- The hours dedicated to practice lessons should increase at the expense of the theoretical lectures.
- The out-of-the-classroom time dedicated to prepare the practical session was excessive for most of the students.
- Classroom conditions were not adequate for working in groups
- Students demanded more interactive sessions which include the study and analysis of real cases.
- No comments were included regarding the oral presentation, which we can observe that had a positive feedback from the students in this practical session.

A group activity was analysed in the course "Urban Planning and Programming" (*Planeamiento Urbanístico y programación* with UPV code 32262), which is a mandatory subject in the Master Degree in Transportation Planning and Urban Development (*Máster Universitario en Transporte, Territorio y Urbanismo* or MATTU) taught in the School of Civil Engineering of the UPV. This is a subject for specialization in urban planning, in particular in integrated action programmes, which is filed during the second semester.

For the realization of the activity, the class comprising 25 students is divided into three groups and each group is provided by a complete copy of a development project. The main objective of this activity is to obtain critical analysis of a section of the project. This section is assigned to each group randomly. The procedure is explained by the professor and a guideline document is provided, including the evaluation rubric and the time-spent survey shown in Figure 3. Under student demand, individual tutorials are conducted in out-of-the-classroom hours. At the end of the task the students submit a report with the analysis performed and prepare an oral presentation of the work of about 10 minutes, which is evaluated by the other groups.

In this activity, the students considered very positive the time dedicated by the professor for the explanation and indications regarding the oral presentation. It is also concluded that in most of the cases, when comparing the time-spent results, the students in latter courses have a more defined time scheduling. For this reason we found very important to include this concept of time managing in the first years of the Engineering and Architecture degrees.

Other experience has been carried out in the course "Environmental Assessment of Plans and Projects and Intervention in the Landscape" (*Evaluación Ambiental de Planes y Proyectos e Intervención en el Paisaje* with UPV Code 32269), which has 28 students enrolled, being mandatory in the Master's Degree in Transportation, Urban Planning and (*Máster Universitario en Transporte, Territorio y Urbanismo*) taught in the School of Civil Engineering. The course is filed during the first semester.

This is a subject introductory in elemental environmental considerations that has been taken in order to develop plans and projects in transport infrastructures. In the proposed activity professor provides previous environmental information to the students about a real project built -in this case the enlargement of the Port of Valencia-. Students must work independently this information, in non-class schedule, using professor tutoring as needed. Later, the group visits the site and the infrastructure and students are asked to fill a worksheet about the activity. After the visit, the students submit the completed worksheet to the professor for its correction.

In this case, the students considered that the activity carried out was very interesting for them but they admitted that they had not worked the extra information provided previously by the professor and understood the importance of having done. The most important conclusion was that for future similar activities, they would invest more time in preparing the activity in advance.

The last experience evaluated with the survey template was done in the course "Environmental Impact Assessment of Civil Works" (*Impacto Ambiental de la Obra Civil* with UPV code 3556), an elective subject in 5th year (2nd cycle) of the degree of Environmental Science, taught in the School of Civil Engineering. This is a subject of specialization in Environmental assessment of projects, which is filed in the second semester and for the course 2011/2012 the number of students enrolled was 8 students.

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The activity done consisted in carry out an individual task tutored by the professor and with an oral presentation.

For the realization the activity, professor gave to every student a specific scientific and technical article, with a medium-high difficulty of analysis, related to aspects of environmental assessment of real-word projects. Each student is provided by a guideline document to prepare the activity including the evaluation rubric. The main objective of this task is to do a critical analysis which includes the most relevant contributions of the article, author's professional profile, etc.

The methodology followed is completely guided by the professor conducting face group tutorials with time enough to work those aspects taking into account the evolution of the group to achieve the competences. Individual tutorials had been taken place at different points during the activity with face-to-face interaction. Also these tutorials can be done for the group as a whole. Students, at the end of the task, must submit a report which is assessed by the teacher, and also have to do an oral presentation of the work done, in approximately 10 minutes exposition. This part of the task is evaluated not only by the professor but also by the other students.

In this case, students valuated positively the activity and reconsidered in a critical way how they have spent their time. With the professor help, the students recognised that they have learned to distribute and make a better and more efficient use of their study time.

f) Conclusions

This paper compiles different survey templates developed for measuring the time spent by the students and corrective feedback for several tasks types. The feedback obtained by the students in these surveys is useful for the professor to schedule the lessons and prepare activities to reach the learning objectives.

From the first analysis of the obtained data from the surveys, we have realized that the use of the proposed surveys after doing the different activities causes reflection on the students about how they use their time in preparation of the activity and studying and the importance to prepare properly the tasks proposed by the professor for out-of-class activities.

Of course, the time spent by the students in finishing a given task is not the only variable to be considered in order to analyse the student achievement. Other factors like student's attention to learning, the results of the activity, and corrective feedback have been also identified as important and will be taken into account in the evaluation.

The method proposed in this paper for measuring the opinion and the actual time spent by the students in the different activities is available at the *Universitat Politècnica de València* to obtain corrective feedback for the professor scheduling and preparation of the learning activities. This technique is being tested in the academic year 2011/2012 in Architecture and Engineering Higher-Education Degrees with very good acceptance by the students, and the results will be evaluated in a 3 year study period.

7. REFERENCES

[1] European Higher Education Area (EHEA) official website. http://www.ehea.info/

[2] P. Honey, A. Mumford, Manual of Learning Styles, London, 1982

[3] K.A. Smith, "Cooperative learning: effective teamwork for engineering classrooms," Proceedings Frontiers in Education Conference, paper 2b5, pp. 13-18, Atlanta, USA, Nov. 1995.

[4] D.A. Kolb, Experiential Learning: experience as the source of learning and development, Ed. New Jersey: Prentice-Hall, 1984.

[5] T. Gärling, R. Gillholm and W. Montgomery, "The role of anticipated time pressure in activity scheduling", Transportation, Vol. 26 (2), pp. 173-191, 1999.

[6] J. L. Epstein and F. L. Van Voorhis, "More than minutes: Teachers' roles in designing homework", Educational Psychologist, Vol. 36(3), pp. 181–193.

[7] M. Valero-García, "¿Cómo nos ayuda el Tour de Francia en el diseño de programas docentes centrados en el aprendizaje?", 16 de julio de 2004.