

SPREADSHEETS IN EDUCATION

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ÖZET:

Bu çalışma işlem tablosunun eğitimde kullanımı ile ilgilidir. Çeşitli branşlardaki öğretmenleri işlem tablosunu kullanmaya teşvik etmek ve onları bu yönde cesaretlendirmek amacıyla literatürde rastlanan bazı örneklerle bu çalışmada yer verilmiştir. İşlem tablosunun kullanımının ancak bir eğitim programı çerçevesinde ve eğitim programlarının genel hedefleri ile birlikte düşünüldüğünde bir değer kazanacağı bu çalışmada vurgulanmıştır. Ayrıca bu çalışmada işlem tablosunun okulların idari amaçları ve çeşitli eğitim uygulamaları için de kullanılabileceği belirtilmiştir.

ANAHTAR SÖZCÜKLER: İşlem tabloları, eğitimde işlem tabloları.

ABSTRACT:

This paper deals with the use of spreadsheets in education. The advantages of using spreadsheets in the educational context and some suggestions made by various people in the literature are also addressed to encourage teachers to utilize spreadsheets in various subjects. It is emphasized that the usage of spreadsheets can only be of real value as long as they are put into an educational context and are integrated with the major objectives of the curriculum. It was also pointed out that spreadsheets can be used for school management purposes and for various instructional activities.

KEY WORDS : Spreadsheets, spreadsheets in education.

1. INTRODUCTION

Did Daniel Briclin who first developed the electronic-spreadsheet programs called Visicalc in 1978 know that spreadsheets would be used in the various ways they are used today? It is most likely that the answer is "no." As software programs spreadsheets can be used in many creative ways in various areas like transportation, education, business including all kinds of profit/loss calculations and the like.

At a first glance one may only see a screen of a grid of columns and rows which at their intersection produce a large number of cells or boxes. But, considering its capacity for that, each cell can store and display text, such as headings, or store and display a number, or formula calculations of a lot of contents

can be done almost instantly. When any content is changed the formula will automatically recalculate the rest of the spreadsheet.

Means et.al [1] classified spreadsheets as "General-purpose tools." They added that as a tool spreadsheet can be utilized to facilitate educational and work-related tasks. Those software classified as "tools" provide flexibility to the teacher to be used for a wide range of activities across the curriculum.

It can be seen that spreadsheets are open to one's imagination. Although spreadsheets are not the only ways of overcoming emerging problems of the 20th century in terms of coping with large scale information processing, they are one of the most powerful alternatives to the traditional methods of overcoming some difficulties like limited time, competitive society, restricted budget, high demand, high consumption and the like.

Many reasons can be listed about the advantages of using computers in various fields, and these reasons would apply not only to spreadsheets but also to other software programs. One of the most important reasons seems to be that a lot of work can be done accurately by computers much faster than is humanly possible.

2. APPLICATIONS OF SPREADSHEETS IN EDUCATION

In the field of education, spreadsheets can be utilized in so many different ways. For example, many teachers expressed the view that spreadsheets reduce the need for tedious calculations allowing greater attention to be focused on the subject itself. This feature of spreadsheets can be used in many different disciplines across the curriculum. On this issue Dyrli[2] said that handling sizable amounts of numerical data makes it difficult to concentrate on the subject matter in mathematics. Dyrli stated that spreadsheets can be used to avoid this tedious process and provide the opportunity to concentrate on the main subject being studied.

Dyrli also added that the distinction should be made between "content of the curriculum" which includes terms, facts, symbols, formulas, principles etc.

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and "process skills" which cover observing, measuring, inferring, communicating and experimenting. On the basis of this distinction, the students should be given the opportunity to design and develop their own templates in each content area, and also to use the devices to solve problems and make decisions on the basis of quantified evidence. To achieve these objectives spreadsheets are recommended by Dyrli [2], since spreadsheets are believed to be capable of solving almost any problem involving numbers or formulas, and are especially powerful if data is to be used repetitively and changes over time.

Spreadsheet software or any other software programs should not be seen as something separate from the general class activities, major objectives of the curriculum and the life outside the school. These programs need to be placed in a context. For example, most educators want their students to be reflective thinkers. That is, the students are expected to form their own ideas, to develop their own hypotheses and test them against the reality. In this respect, various software programs can offer a variety of different ways of arranging learning conditions [3]. To achieve this objective some spreadsheets have been developed to encourage the students to use computers to handle the experimental data they collect. Experimental studies are done in many different subject areas in the curriculum and spreadsheets can be utilized to enrich the learning environment.

Osborn[4] believes that, spreadsheets are believed to be a great help in providing a quick and powerful way to display the experimental work. Presenting each student's result in a table through spreadsheets can be very motivating and time saving. But, how big or how small should this table be so that it is easy to see the general trend? Philips[5] argued that we cannot store large amounts of information before we begin to process it. He proposed that a well-designed graphical display can be used as a kind of memory store. Therefore, by using spreadsheets either the raw data or the results of an experiment can be presented in a graph or a chart and this would facilitate the perception of the results. On the same issue Brosnan [6] added that with a spreadsheet the results of the calculations can be presented as a graph rather than a row of numbers and this allows the students to gain a greater "feel" for the principles involved.

In addition to above examples Bitter [7] talks about different ways of using spreadsheets in education. He said that spreadsheets can be used not only in math but also in other subjects like social studies. He gave some examples of possible applications like the calculation of population growth, income distribution and census information. He added that spreadsheets can be effectively utilized in the field of education (for school management purposes and classroom applications) such as in keeping student

records, for budgeting purposes for the school and for management of data for researchers.

3. MOTIVATIONAL ASPECT OF USING SPREADSHEETS

No matter how powerful a software package is, the users should be convinced that it has a lot of advantages over conventional methods. Otherwise the user is not motivated to use it. Especially in the area of education the word "motivation" is very important. If a student is not motivated to learn anything either the learning will not take place at all or will take a much longer time than it should. So, the teacher is not only responsible for teaching his or her subject but also responsible for making the subject enjoyable and motivating. Therefore, it is important to remember the affective aspect of teaching computers along with the cognitive and the psychomotor aspects.

Catlerall and Lewis[8] stated that spreadsheets can be used to achieve the objectives of a "scientific method game." In their article they explained how spreadsheets can be employed to create some games and how they can be used in problem-solving. They added that "approaching problems through scientific ways of thinking" is very crucial and spreadsheets can be utilized to encourage such thinking.

Spreadsheet use is not limited to these specific subjects discussed above. They can be used in various other subject areas. For example in language courses spreadsheets can also be used effectively. By doing so the teacher not only teaches his or her subject but also makes it enjoyable. This is where the teachers are required to use their imagination. For example, Der and Fiala [9] suggested "The Multi-Purpose Dictionary" in language courses. They said that learning a foreign language takes a very long time maybe a life time and by using spreadsheets, like the one they suggested in their article, the user can create and maintain his or her own multi-purpose dictionary and take advantage of spreadsheets.

The administrative aspect of education should also not be overlooked regarding the value of spreadsheets. In many schools the number of students, the number of staff and the number of materials used in laboratories and for other purposes are increasing. This needs well-organized administration. For instance, keeping records of the pupils is an important task for the teacher to monitor the students' progress. By using spreadsheets, information about the students can be stored, and can be used for statistical purposes. From the administrative point of view, the number of newcomers, the number of dropouts and all sorts of information can be compared and presented by graphs. This would also help in communication between the schools and other institutions.

An example of the use of spreadsheets for ad-

ministrative purposes is described by Swan[10] where Lotus 1-2-3 was used by a college of health sciences in recording and monitoring of science laboratory stocks and this had dramatically reduced the administrative workload and improved quality control.

4. SOME CONCERNS EXPRESSED IN THE LITERATURE

Before summarizing the main advantages of using spreadsheets expressed by various people, it might be useful to mention some of the concerns raised by some users of spreadsheets.

Dyrli[1] said that the major barrier to using spreadsheets as an educational tool remains the fact that there are not yet very good curriculum models available to demonstrate how spreadsheets can best be used to facilitate, enhance and extend the acquisition of content and development of student process skills. According to the literature most people agree upon the point that, the usage of spreadsheets can only be of value as long as they are put into an educational context and are integrated with the major objectives of the curriculum. As an educational tool spreadsheets can be very effective if they have a place in the process of curriculum development.

As Chamberlain and Vincent[11] noted, inevitably, users will need to develop some skills to operate spreadsheets properly. But, this is true for every new technological development, like driving a car, using a cash till and the like. By all means the process of acquiring these skills will take time but, it seems that its advantages outweigh the disadvantages.

5. CONCLUSIONS

In conclusion from this discussion, the main advantages of using spreadsheets in education have been found to be following;

First of all, spreadsheets are considered to be very useful in terms of saving time. Sorting, searching, classifying, comparing measures and findings, and printing can be done in a very short time. Also, a lot of calculations can be handled easily and repetitively without requiring any programming knowledge by spreadsheets. In addition, if a change is made to the contents the result is automatically calculated which allows greater time to focus on the main subject rather than the calculations.

The results can also be graphically displayed which makes it easier to see the general trend. Spreadsheets can be used as a database and to produce some statistical analysis as well. As far as the affective aspect of using spreadsheets is concerned, by using spreadsheets learning can be enriched, enhanced and made enjoyable. For example, students can support their arguments with numbers and graphics which they obtain from spreadsheets, and this can be very motivating and intellectually satisfying.

It is the author's view that spreadsheets can successfully be used to motivate students to become interested in numbers by engaging them with some exercises. For instance, children, even at the primary school level, can be encouraged to keep records of their weekly expenditures. It would help them to see how any change made in one cell changes the total. If calculations for similar purposes were made by hand that would make the students reluctant to get engaged with numbers because of repetitive calculations. Since the data manipulations are easy and visible via spreadsheets that would motivate the students to get involved with numbers. By taking advantage of spreadsheets students can put the needed formula in the cells to complete the task. This feature of spreadsheets, that is a great control over the operation, helps students to make any changes without being concerned with the necessary amount of time. It is also very important for the students to recognize that each piece of data entered into the spreadsheet is related with the other data. This can easily be noticed since any change made would affect the whole spreadsheet.

It is believed that spreadsheets are very powerful tools and can be used in various ways in the field of education. It seems that there is a need for supporting materials for using spreadsheets in various subjects. Therefore, it could be said that, if more supporting materials about how to use spreadsheets were available they would be widely used in many different subject areas across the curriculum.

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