

EDUCATIONAL APPLICATION OF THE PROGRAM EXCEL¹

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Abstract

The application of the program Excel is most often associated with different calculations like financial analyses and their interpretations in the form of graphs. This program is most often used by mathematicians, economists and other specialists in the field of science. So far the program Excel has not been very popular in the area of architecture or urban planning, mainly because of the lack of appropriate application programs. The author, who has developed such an application, has been using the described program during classes with students at the Faculty of Civil Engineering and Architecture of the Technical University of Szczecin. Thanks to that it was possible to present the problems concerning the preservation of cultural continuity in existing and planned urban complexes. It has also been briefly shown and illustrated how to use Excel with its supplementary application.

The use of the program allowed to provide more detailed information and present all the stages of the research process in real time. Thanks to a very suggestive graphic presentation it was possible to illustrate the observed deformation processes of existing urban complexes and to show how to build basic principles which can prevent such negative phenomena.

The use of the program Excel with its new application proved extremely helpful during lectures and presentations popularising the awareness of negative consequences of cultural and spatial continuity disruption in existing high quality settlement structures, which can lead to serious deterioration of the living standards in the city.

¹ a spreadsheet included in the Microsoft Office Software Package operating in the system Microsoft Windows. The program Excel processes data into information by means of advanced analysis tools, communication and providing results.

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Słowa kluczowe: urbanistyka, diagram ciągłości przestrzennej, microsoft excel, dydaktyka.

Streszczenie

Zastosowanie programu Excel kojarzy się najczęściej z obliczeniami, których efektem mogą być na przykład analizy finansowe i ich interpretacje w postaci wykresów. Z programu Excel korzystają zazwyczaj matematycy, ekonomiści oraz specjaliści z innych dziedzin nauk ścisłych. Zastosowanie tego programu do badań w dziedzinie architektury i urbanistyki było dotychczas rzadkością, m.in. ze względu na brak odpowiednich opracowań aplikacyjnych. Autor, po opracowaniu takiej aplikacji, wykorzystał omawiany program w prowadzonych przez siebie zajęciach dydaktycznych na Wydziale Budownictwa i Architektury Politechniki Szczecińskiej. Umożliwiło to pełniejsze naświetlenie problemów związanych zwłaszcza z zachowaniem ciągłości kulturowej w istniejących i projektowanych obszarach zurbanizowanych. W artykule omówiono skrótkowo sposób korzystania z programu Excel po jego aplikacji, poparty materiałem rysunkowym.

Posługiwanie się omawianym programem umożliwiło znaczne wzbogacenie i uszczegółowienie przekazywanej wiedzy oraz przedstawienie wszystkich faz w procesie badawczym w czasie rzeczywistym. Dzięki zastosowaniu sugestywnych wykresów, możliwe się stało odpowiednie zilustrowanie obserwowanych procesów deformacji istniejącej zabudowy miejskiej. Możliwe jest także właściwe przedstawienie i czytelne formułowanie zasad zapobiegania powstawaniu negatywnych zjawisk.

Zastosowanie omawianego programu po jego aplikacji podczas wykładów i ogólnej prezentacji omawianych problemów stało się pomocne w upowszechnieniu ogólnej świadomości na temat szkodliwości, jaką niesie ze sobą naruszanie ciągłości kulturowej i przestrzennej w istniejących często wysoce wartościowych strukturach zabudowy, prowadzące do znacznego obniżenia standardu życia w mieście.

The unprecedented progress in the field of computer technologies which has taken place in the last several years brought about their widespread use in our everyday life, in industry and many fields of science. This is the development of computer software that enabled such a big triumph of computer technologies. As computer programs are becoming friendlier to their users, more and more people without professional knowledge of computers can use them efficiently. Modern programs are designed so that people could use them effectively knowing only some general rules. It is often sufficient enough to familiarise with one basic computer program to be able to operate most other applications. In this situation it is obvious that Information Technology has already entered into the field of education.

The process of teaching makes use of computer technology in two different ways. On one side it teaches the appropriate selection and use of both computer software and hardware. On the other side various computer programs greatly facilitate the process of teaching. Due to that many academic lectures and classes can become more attractive and easier to understand.

Different complex scientific issues can be easily presented with the use of new multimedia. And for this purpose the program Excel has turned out extremely useful. The practical application of this program is most often associated with different calculations like for example financial analyses and their interpretations in the form of graphs. This program is most often used by mathematicians, economists and other specialists in the field of science. So far Excel has not been very popular for construction, architecture or urban planning, but it can prove to be very useful just in these fields. The author has been using this program for many years to conduct research on cultural continuity preservation within the existing and planned urban complexes. In order to enable the effective work of this program a special supplementary application has been added, which consequently led to the establishing of a new original research method called Spatial Continuity Diagram (SCD method). The new method greatly improved the process of teaching architecture including the problems of modern shaping and converting of urban spaces.²

Opening Excel is the first thing to do in order to use SCD. It should be followed by starting the special supplementary application written in Visual Basic. Then a new menu appears on the screen, called analysis. The exact location of this menu in the program is shown in Figure 1. While developing the menu a number of commands can be seen, which are divided into three groups. The first one includes commands dealing with the range of research conducted with the SCD method. The second includes commands necessary for building a questionnaire for the appropriate analyses of urban complexes research. The third group includes commands enabling to carry out planned research on the basis of previously collected data. The selection of commands is well presented in the form of graphs in Figure 2, where special arrows show the exact location of the described command groups.

A clear division of the described groups in the program, apart from being an example for research conduct, has an important educational value. It draws students' attention to the importance of collecting and dividing different data before the proper designing process takes place. The analysis of the collected information enables designers to make right decisions. Conducting a questionnaire is one of many ways of collecting data, and plays an important role in the method of SCD. Thus, all the questions used in a questionnaire must be carefully selected for the purpose they serve. Only then will it be possible to come to right conclusions.

² the SCD method allows to collect, process and provide data in the graphic form about the most important architectural and urban features of existing and planned urban complexes. Thanks to that it is possible to form appropriate guidelines helpful in the process of transformation and development of the existing urban complex. All information collected during research allows more objective shaping of urban space while at the same time preserving its spatial continuity.

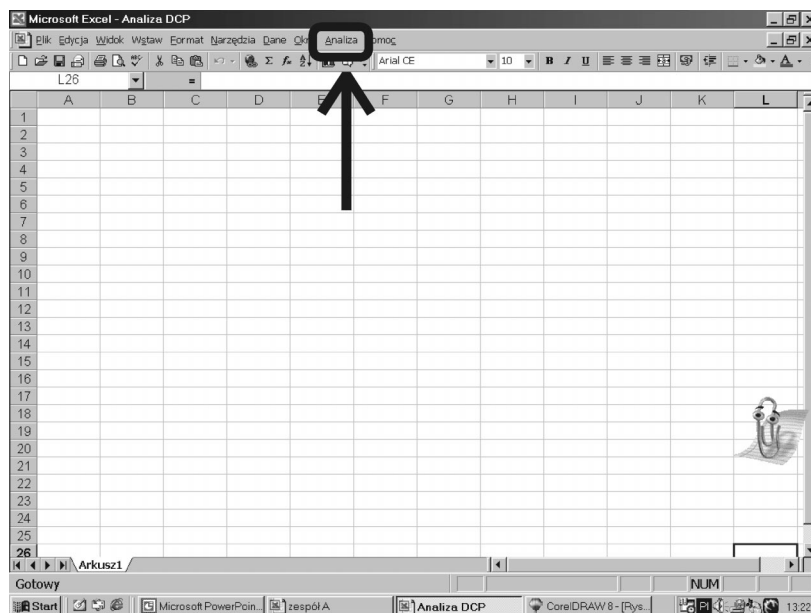


Fig. 1 Exact location of the new menu in the program Excel allowing to conduct research by the SCD method. Source: own study

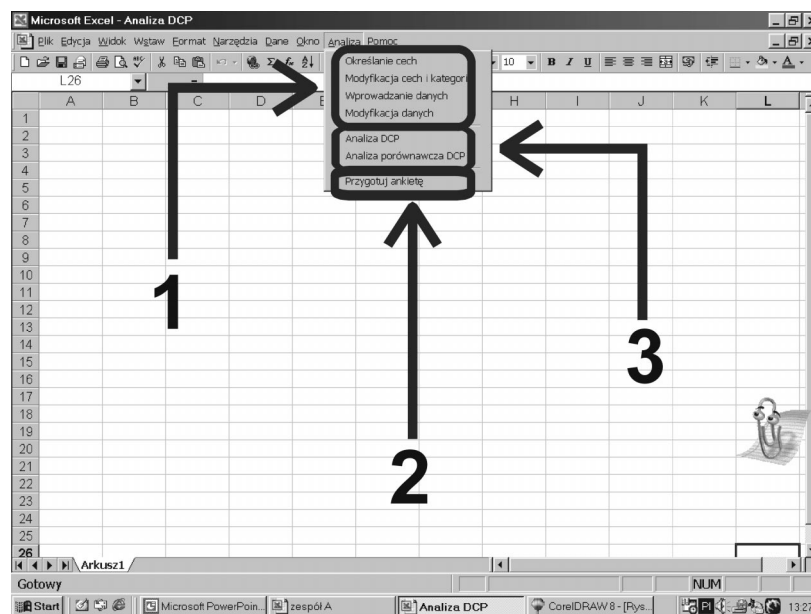


Fig. 2 Selection of commands according to the task to be performed by the SCD method. Source: own study

The first group of commands should be used to help design a questionnaire and choose the right set of questions, which are in this method grouped on two levels. The first level includes morphological features of research building development, whereas the second level includes corresponding categories of these features. The appropriate balance between these features and categories is very important from the educational and research point of view. Figure 3 shows one of the dialogue windows for preparing such a questionnaire which enables the introduction of appropriate features into the program and then feature categories necessary for the examined building development and urban space. Thanks to the use of a multimedia overhead projector during the presentation and the running speed of the program Excel, the audience have the possibility to follow the process of questionnaire construction in real time while watching carefully the logic and relations between features and corresponding categories.

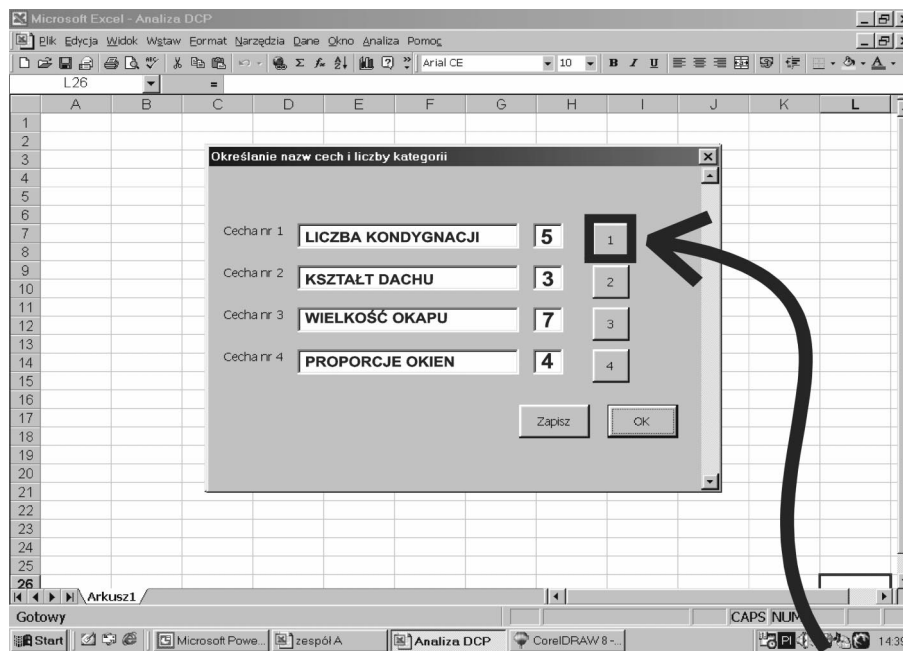


Fig. 3 One of the dialogue windows for the introduction of appropriate features and their categories into the program. Source: own study

When a questionnaire is ready it is automatically edited and prepared for printing. All the data collected during a local visit have to be then entered into the program and this activity is the last one in the SCD method to be done by hand. The entering of the data collected in the questionnaire into the window especially designed for this purpose is presented in Figure 4 by means of arrows and shaded areas.

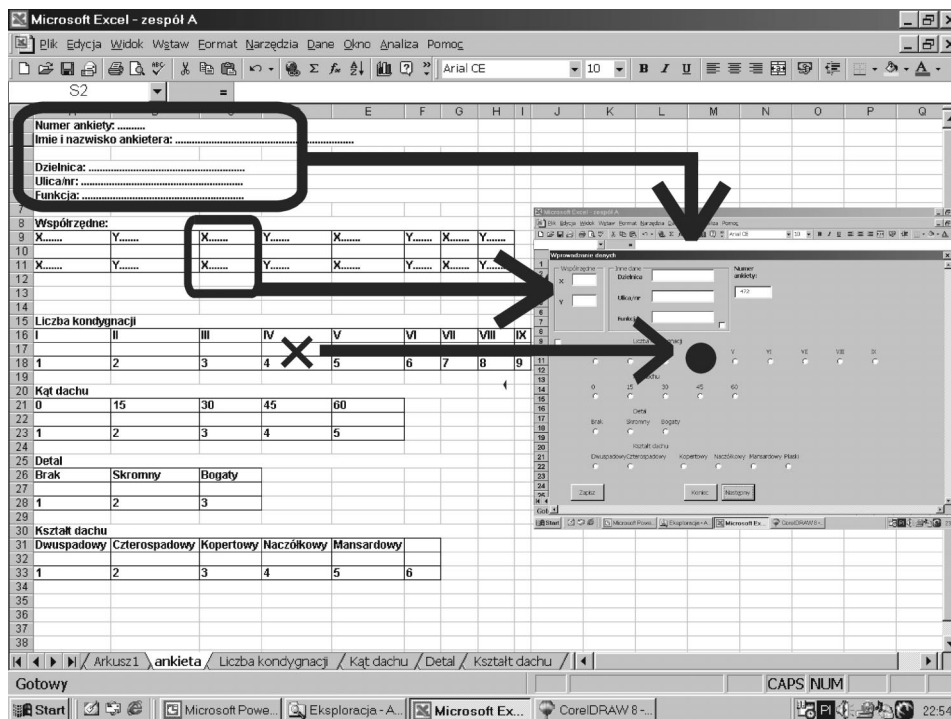


Fig. 4. Entering data collected from questionnaires into the specially designed dialogue window
Source: own study

From this moment all activities are conducted automatically.

Entering data in Excel can also be demonstrated in real time.

In the SCD method thousands of pieces of information can be analysed at the same time, which would be very laborious or even impossible without the use of a computer technology.

All graphs generated by the program clearly illustrate the present spatial state of the examined building development. They also allow to analyse future investment plans. The SCD enables to analyse both the existing as well as the constructed building development by the use of identical research procedures. Excel makes it possible to present a number of graphs which plainly illustrate spatial relations in a planned investment.

The results of all conducted analyses concerning the examined building complex are gathered together in one spreadsheet and presented in Figure 5. The row marked by the first arrow includes two charts presenting the percentage category of the examined features. The middle row marked by the second arrow includes graphs called "electronic inventory". With the use of these graphs it is easy to present the state of planning of a given building development including the location of particular categories of a given

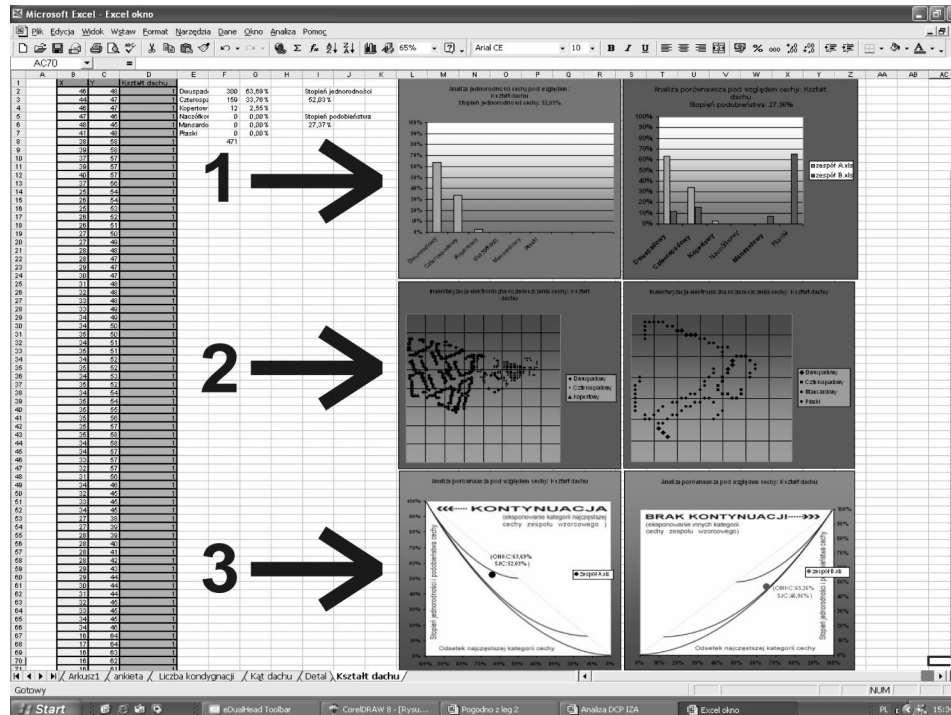


Fig. 5. Final findings of a comparison of two housing settlements, presenting the percentage category of the examined features, electronic inventory and research into continuation of spatial continuity
Source: own study

feature. The last pair of graphs marked by the third arrow, in accordance with the assumption made in this research, allows to state if a new building complex will add to the further harmonious development of the examined building complex, or whether it will only degrade the existing urban space. These graphs play a very important role in the educational process as they allow to simulate different solutions, and while examining their features it is possible to foresee the consequences of the suggested solutions.

All lectures or computer research presentations should be accompanied by appropriate visual aids such as films, slides or photographs showing direct relations between the presented graphs and numbers with their spatial consequences. Figure 6 presenting research results concerning one of building complexes of single-family housing in Szczecin may be used as an example.

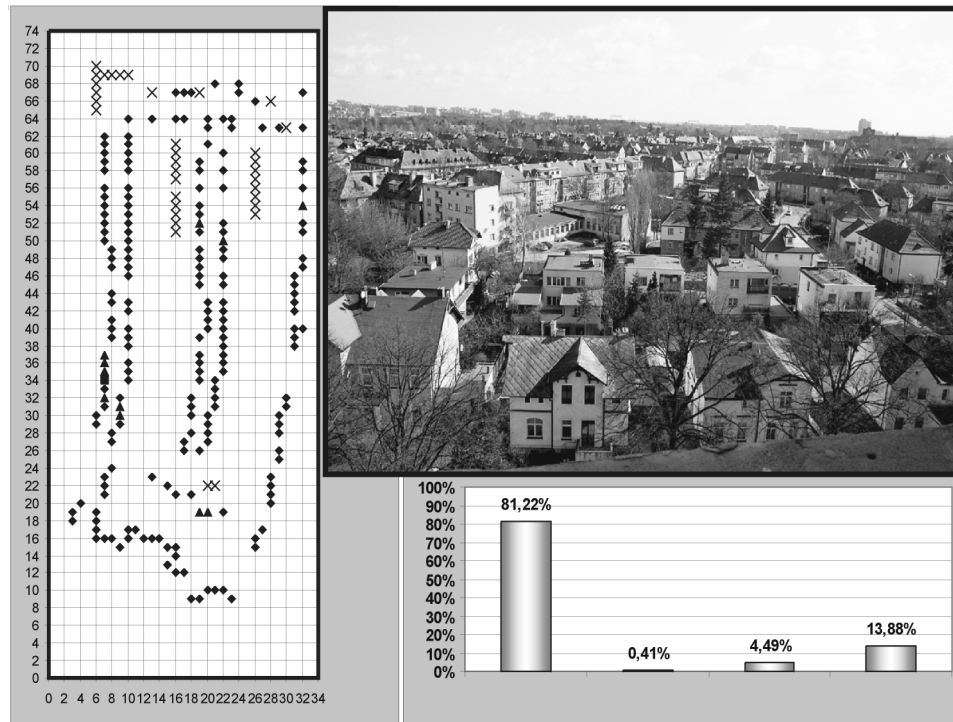


Fig. 6. One of photographs of the building complexes of the single-family housing analysed by the SCD method
Source: own study

Conclusions

1. Excel has proved to be an excellent tool in both research and educational process. It is very efficient and flexible, so it can be easily used in the field of architecture and urban planning after opening a special supplementary application. The method of Spatial Continuity Diagram (SCD), invented by the author, proved to be very successful in his own research and teaching.

2. Thanks to the high working speed of the program all stages of research conducted by the SCD method can be presented in real time, which is very important for following the presented material, and makes the presentation highly attractive to students.

3. The program Excel provides many possibilities for different calculations and their presentations in the graphic form, and thus enables clear and systemised way of presenting information on very complex problems of research and urban space shaping.

4. Excel and its supplemented application enable to codify and compare different individual designs. Thanks to that it is easier to show students the testified views on the necessity of evaluation of investment plans in a wider spatial and cultural context.

5. Architectural and urban design is often associated with work based on personal experience and author's intuition, which is difficult to analyse and evaluate in terms of science. The ability to operate the program Excel, on the contrary, can encourage both students and young architects to start using different computer programs for their use in designing and analysing the existing environment conditions.

6. The use of the program Excel and the SCD method to discuss complex problems of shaping urban space are an opportunity to show students the most characteristic and better justified examples of violating the existing space structures by new building developments, which were part of cultural continuity of an estate, a town or a region.

References

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