Semiology Improvements In PDA Maps For The Pedestrian Tourists

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Abstract   This work shows symbol selection for the usage on city plans for tourist purposes considering the efficiencies of PDAs (Personal Digital Assistants) for their everyday usage. A questionnaire used for the research is focused on everyday PDA user being at the same time real or potential tourist, and today it can be almost anybody. The aim of questionnaire is to select symbols/icons for cartographic usage of PDA screen. We are testing not only symbol types but also the means of presentation, size of symbols and possibilities of their visualization on real tourists in the city of Zagreb.

Introduction

Let us assume that users share similar reactions and that they have similar perceptive abilities for symbol usage on PDA screens. The methods of presenting information on maps are connected with the experience of cartographers (Župan, Frangeš 2008). If ten cartographers make a map for the same purpose all their solutions give ten different maps. Users can perceive the data, and objects and their attributes more easily on maps by using their symbols (Hedley 2001). The attributes determine symbol selection during map design process. With graphic variables we can shape the communication methods between map and user in appropriate way with graphic tools of PDA-device.

Symbol selection has been performed by means of questionnaire survey method among students, expert cartographers and members of Croatian Cartographic Society and it contains terms which are considered to be customary for the tourist city plans (on paper, internet or PDAs). For that purpose we made a prototype of tourist city plan for usage in PDA and it is presented with the support of program ArcPAD, which is the product of ESRI company, on whose official (URL 1) and unofficial internet pages (URL 2). Symbols are offered in the first questionnaire, but the symbols for second and third questionnaire have been taken

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by author's choice from city plans made by Prof. Lovric from the Faculty of Geodesy in Zagreb along with inevitable numerous internet sources. Different symbols has been found for every term offered to the examinee. Tourists are people of different nationality so it's important to offer them symbols which are recognizable on global scale.

Objectives

The objective of the questionnaire is to narrow down the symbol selection for the use on tourist maps and plans on PDA. Examinees choose symbols which they consider most appropriate for a specific term. Objective are improvement of cartographic visualization on PDAs maps (Župan 2009).

Methodology

If the questionnaire method is compared with an interview, we can see that the questionnaire is less time consuming and it's more economical but there is no personal contact as it is the case in an interview. This disadvantage can be neutralised by properly compiled questionnaire having proper instructions. Its advantage is in fact that we can send questionnaire to distant persons (e .g. e-mail) (Mužić 1999). When analysing the questionnaire we should take into consideration some negative elements of this procedure. The answers shouldn't be taken for granted. For example, the answer often doesn't reflect the reality. It is not necessarily caused by the need to avoid the truth. User can be careless while answering and also he/she can have some difficulties in understanding the question. If we want to avoid an insincere answer, we could use anonymous questionnaires (in our case the questionnaire is delivered by e-mail with the answers coming to the examiner by return mail, so it cannot be anonymous). Anonymity will not eliminate the insincerity when it is the matter of bad impression anxiety of the examinee. That would mean that the insincerity due to such reasons can be avoided if the questionnaire is conducted individually (like in our case).

Procedure

When conducting a poll on paper with students and after that with cartographers, the examinees were instructed to circle the selected answer on paper, and the third poll conducted by e-mail was somewhat changed. Conducting a poll using the

medium other than PDA-screen, every examinee was offered a small rectangle together with the answer (Fig. 1).
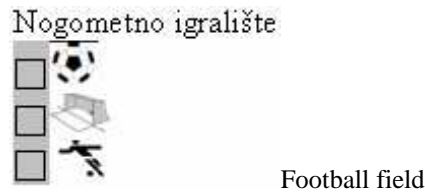

Football field

**Fig. 1. Offered term and offered answers in the shape
of picture symbols (closed type questions)**

The symbols given in the first questionnaires are black and white because we think that these symbols will meet the demands of legibility and layout in combination with the rest of the map contents. Nevertheless, at the end of the questionnaire there are two additional questions: „would it be better if the symbols are coloured?" and „Is the size of the symbols appropriate for symbols to be clear, understandable and unambiguous?" etc. Before that the examinee is given a remark about the poll procedure on computer screen or on paper, and that the symbols will be shown on the PDAs small screen.

Expectations

The results of the questionnaire should show which of the symbols offered remind an average user mostly of real objects or of offered term and also whether there is a difference compared to symbol chosen by experienced cartographers.

It is expected that examinees will:
− choose cartographic symbols for presentation on PDA screens according to offered terms
− select the symbols which are traditional on paper maps
− accept the possibility of individual choice and the possibility to change the symbols on map for every term.

Results

After the poll conducted with 25 cartographic students and 10 cartographic experts at the Faculty of Geodesy the results of which have been analysed in details and presented in the work Župan (2008). After that the questionnaire has been improved in accordance with the results obtained and then again conducted by e-mail with altogether 29 examinees (members of Croatian Cartographic Society)

which results from this questionnaire are presented in this paper. There are only some characteristic questionnaire results presented here out of the total of 66 different terms encompassed by the questionnaire. Results are presented in Fig. 2. to 14. and Table 1.

Fig. 2. Have you been using PDA or some similar device with *small screen* earlier and use maps on it (for navigation or similar)?
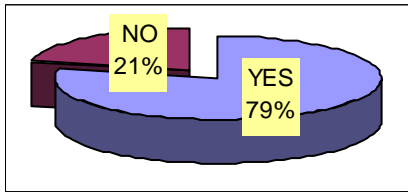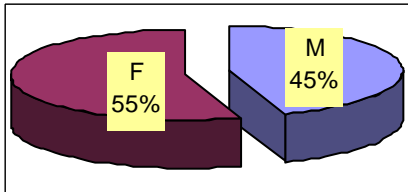

Unanswered (1/29),
YES (22/29),
NO (6/29)

Fig. 3. Gender: M - Male (13/29), F - Female (16/29)

Age average is 38,8 years.
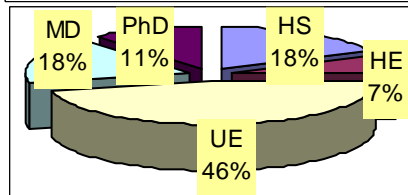
Fig. 4. Qualification: HS – High school education (5), HE – higher education (2), UE – university education(13), MD – master degree (5), PhD – doctoral degree (3), unanswered (1).

Table 1. explains individual result for each symbol/icon. The percentage of examinees that have answered individual questions is written with the given term, e.g. Market (97%).
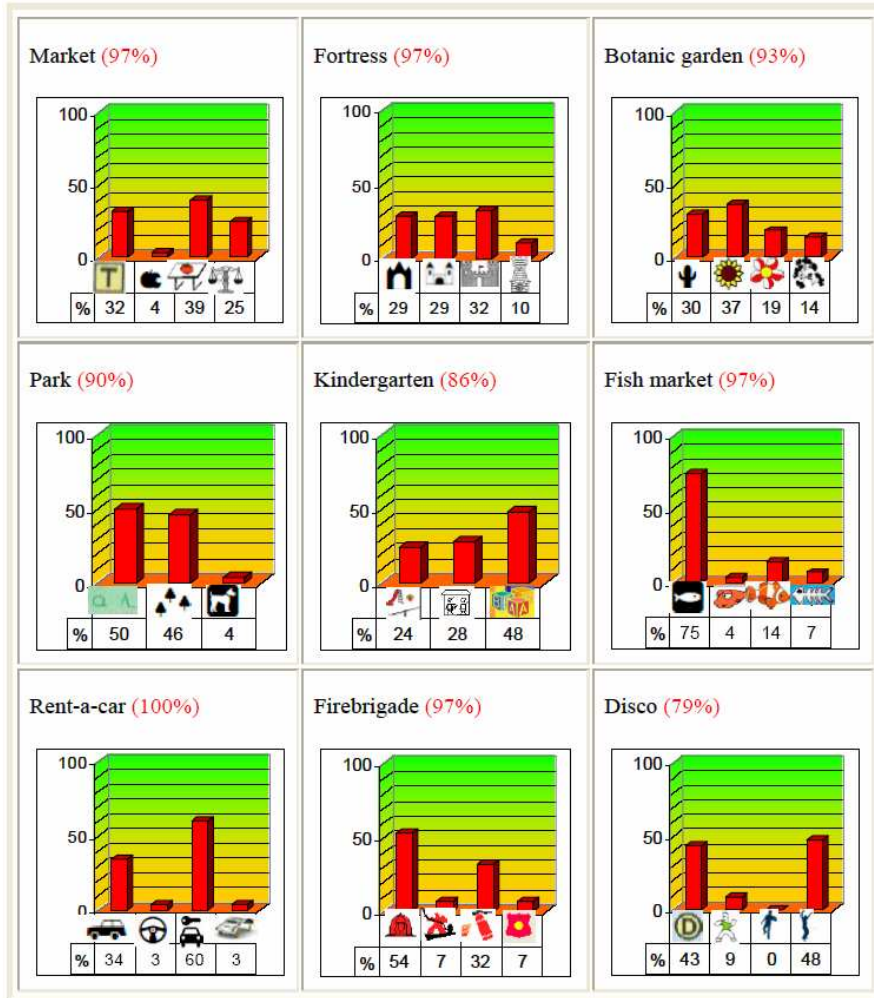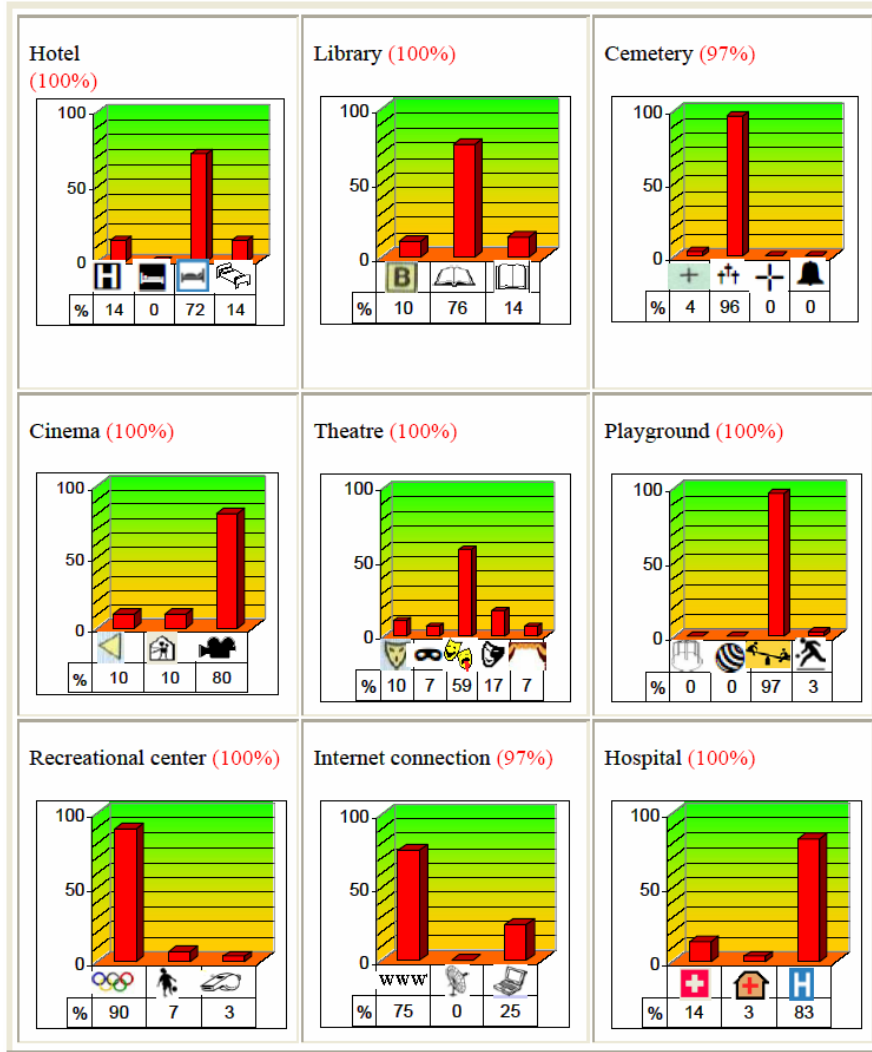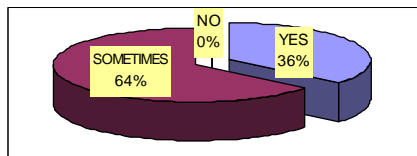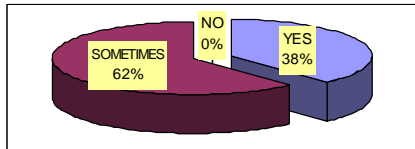
Table 1.

6

Table 1. (continues)

Fig. 5. The selected symbols match notionally the given term above them?
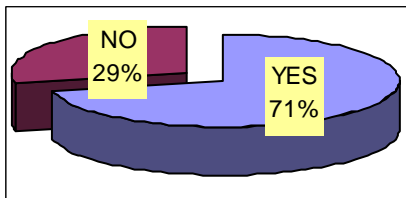

Unanswered (1/29),
YES (10/29),
SOMETIMES (18/29),
NO (0/29)

**Fig. 6. Selected symbols are clear legible?**

YES (11/29)
SOMETIMES (18/29)
NO (0/29)

Fig. 7. Should it be possible for a user (tourist) to change the size of a symbol for the purpose of easier geovisualisation or better perception of presented data?
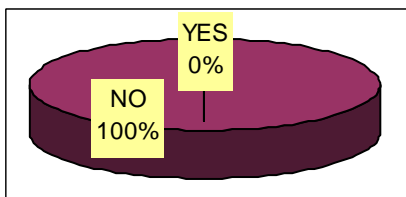

Unanswered (1/29)
YES (20/29)
NO (8/29)

Fig. 8. Should it be possible for a user (tourist) to change the symbols themselves for single terms and offer thereby more symbols to be selected, even if it meant more functions and more learning in the application itself?
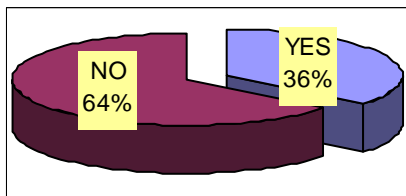
Unanswered (1/29)
YES (10/29)
NO (18/29)

Fig. 9. Are you colorblind?

YES (0/29)
NO (29/29)

Fig. 10. Do we improve the perception of users if we present all symbols coloured?
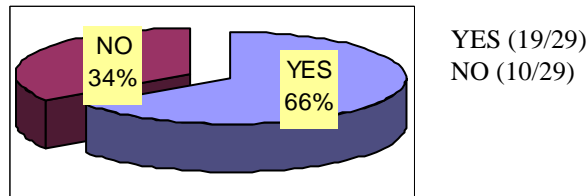
NO
34%

YES
66%

YES (19/29)
NO (10/29)

Fig. 11. Do we improve the perception of users if the symbols are grouped into thematic sets (e.g. transport, free time, culture, accomodation, sports, entertainment, night life, etc.) and presented with the backgrpound of these sets (e.g. culture – blue symbols, trasnport – red symbols etc.)?
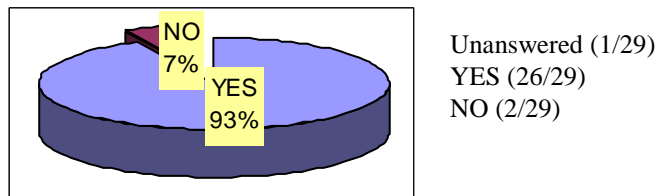
NO
7%

YES
93%

Unanswered (1/29)
YES (26/29)
NO (2/29)

Fig. 12. Is it better to present the selected symbols semitransparent, making thus the rest of the map contents visible?
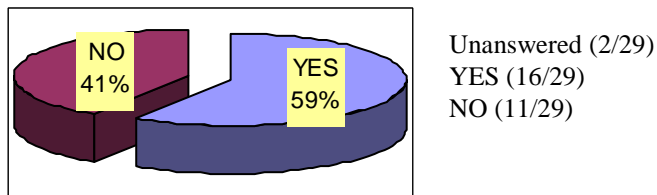
NO
41%

YES
59%

Unanswered (2/29)
YES (16/29)
NO (11/29)

Fig. 13. Do you prefer animated symbols?
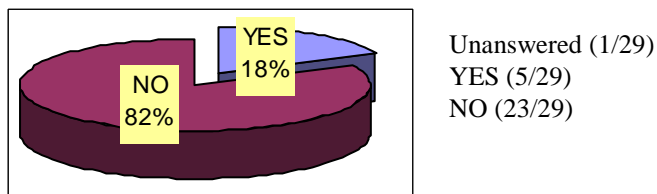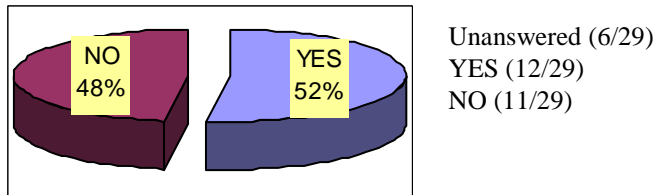
YES
18%

NO
82%

Unanswered (1/29)
YES (5/29)
NO (23/29)

Fig. 14. Would you participate in the subsequent field testing of the usability of prototype tourist application of PDA?

Unanswered (6/29)
YES (12/29)
NO (11/29)

Comments made by the examinees, e.g.: The symbol for kindergarten, fire station, market, rent-a-car, travel agency, disco should be a little bit modified. Consulate and kindergarten should not be presented with a symbol. Market and fishmonger's shop should have the same symbol. Animation would be interesting when presenting the symbols for disco, children playground, direction sign, foot path, riding, lighthouse and paging. Tourists should be given the possibility to turn on and off certain sets of symbols, e.g. only the symbols for sports or culture.

Comments

Even 79 % examinees use or have been using PDA and maps on it. The author accepts the comments on modification of map symbols for some notions. It can be seen that the percentage of given answers for some symbols is very high. The symbol for kindergarten has got the lowest percentage of answers 86 %, and the other symbols have between 90 % and 100 % of answered questions.

The largest variation of vote and hesitation in selecting the symbols can be seen with the symbols representing market, diplomacy, fortress, botanical garden and park, which leads to the conclusion that these notions should better be presented by means of description, i.e. textually or offer different symbols sometimes matched the given notion that is to be presented, but no examinee replied that the proposed symbols did not match the notions. The symbols are clear and legible in similar percentage. Although the examinees would in 36% of cases make it possible for tourists to change the size of symbols, this question should remain open and still be offered to tourist in an interview on screen of PDA. The examinees in the previous poll have spoken out for the presentation of coloured symbols (66%). It means careful selection of colours, with certain contrasts on map when presenting a large number of various geoinformation. Whether it is better (59%) or not (41%) to present the symbols semitransparent, remain open for discussion. The animation of symbols and their possible better perception due to intentional attraction of user's attention has been rejected by the examinees in large percentage (82%), probably because they believe that pointing out an

animated symbol would cause negative attraction of user's attention. One of the comments refers exactly to that issue, and one of the examinees suggests the animation only for the symbols presenting disco, playground, direction sign, foot path, riding, lighthouse, paging (library). If we would animate only a few symbols, and leave the others static, then it would really cause negative and selective effect of attracting user's attention. After the poll, the comments have been taken into account and included in the plan of the Zagreb that has been used in PDA for testing the proposed map (Fig. 15 and Fig. 16) with real tourists in the city of Zagreb using an interview. The results are presented in Župan (2008).

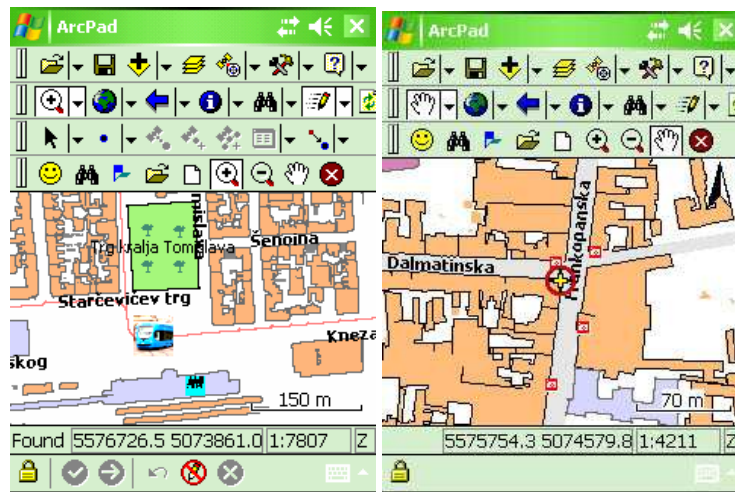**Fig. 15. Proposed visualization for city maps in PDA device**

Fig. 16. Symbols for cartographic visualization to be tested with tourists in real situations

Conclusion

The author tried to present the importance of symbol selection and their significance taking some disadvantages of present PDA-devices into consideration. We conclude that the polls about the selecting of cartographic symbols conducted with students, cartographic experts and members of the Croatian Cartographic Society have proved the proposed symbols as acceptable for wide range of application in PDA maps (regardless cultural, physical or any particular users factors), and for a smaller number of symbols a different solution should have been found (the presentation in textual or some other form). The proposed simplified cartographic symbols to be used in PDA have been checked in the interview with tourists as well. The tourists found the symbols understandable in 95% (Župan 2008). Our recommendation for the future work should be for the opposite research in which the examinees would write down the notions of the symbols and the need to check average tourist perception of each symbol/icon.

References:

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